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**THE MEASUREMENT OF FOOD ATTITUDES
AND PERSONALITY CHARACTERISTICS OF
U.S. AIR FORCE PERSONNEL IN ALASKA**

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		FOOD QUALITY
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A study was conducted to determine food preferences in the context of isolated duty and the current status of available food service systems of Air Force personnel in Alaska. Methods of research included survey administration, job satisfaction measures, and the use of a personality inventory. Six isolated radar bases and two main installations were sampled. The results indicated that, in general, personnel were coping well with the environment. There were no large-scale differences between isolated and control bases relative to food preferences or		

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FOOD VARIETY	ISOLATION
FOOD SERVICE	ISOLATED FOOD SERVICE
MILITARY FOOD SERVICE	ADAPTATION TO ISOLATION

20. Abstract (cont'd)

→ satisfaction with the food service system. Differences that did exist were location specific rather than attributable to isolation per se. An analysis of food service worker job satisfaction indicated that the greatest sources of dissatisfaction centered on pay and promotions. ↗

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SUMMARY

The psychological study of man in isolation has been a recent phenomenon. Much of the work that has been accomplished has centered on personnel selection, performance prediction, and individual adaptation. Very little effort has been expended on any psychological study of food related attitudes and behavior in isolation.

In response to a requirement established by the Air Force in the Department of Defense Food Research, Development, Testing and Engineering Food Program (USAF 3-13), a study was begun to evaluate food preferences and related variables at isolated Air Force stations in Alaska. Six isolated and two control main Alaskan bases were sampled. A battery of questionnaires was developed using two locally designed instruments and two purchased standardized tests. The first two included a measure of an individual's food preferences, "The Food Preference Questionnaire", and an individual's rating of the food service system "The Food Service Questionnaire". The standardized instruments were "The Sixteen Personality Factor Questionnaire" employed to assess environmental adaptation, and "The Job Description Index", used to determine food service worker job satisfaction.

An examination of the demographic data on the total sample indicated that isolated personnel were somewhat older and more senior to personnel sampled at the two main bases, a finding attributable to the need for more experienced personnel at isolated bases. The possibility of some sampling error also existed. Most (74%) of the isolated group had been on separate rations prior to their current assignment in contrast to the control group where approximately half had received separate rations. These findings follow from the fact that the isolated personnel were senior to the controls. Most personnel, both isolated and control, did not report a meal pattern change between their previous and current assignments.

Most personnel in the sample were administered the Sixteen Personality Factor Questionnaire (Form C). Five hundred and one (501) individuals were tested, which included both isolated and control personnel, from which 56 were identified as motivational distorters (not giving a "true" picture of themselves). Both isolated and control groups were more similar to each other in average personality profile than either was to the motivational distortion group. The isolated personnel, however, perceived themselves as somewhat less "trusting" than the control group. The average airmen in Alaska saw themselves as normal men who were responsible, serious, and self sufficient individuals.

Analysis of average personality data across locations indicated few significant differences and none specifically between isolated and control groups. In general, personnel were adapted psychologically to their environment. Analyses of food aversions in the form of "never tried" responses and low hedonic ratings were in agreement with the 16 PF results. The adjusted average food aversion frequency for all bases sampled was in the "normal" range established by previous studies and was not indicative of neuroticism.

The Food Preference Questionnaire contained 100 food names (two of which were the same and were used as a reliability check and one of which was a pseudo-food, "braised trake"). A factor analytic study of the questionnaire itself sought clusters of items that were rated the same by most people. Most of the variability, however, was item specific, and clusters which did occur were along logical lines. For example, a group of sweet items clustered together composing what we called the Sweets Factor. The factor structure for isolated and control groups in Alaska was very similar. However, the structure in Alaska was distinct from that of a sample collected in a previous study within the Continental United States where people did not tend to cluster sweet items.

The majority of food preference ratings were not significantly different between bases in Alaska. It is evident that where a man was assigned within Alaska did not determine to any significant degree what individual foods he preferred. There was no evidence to suggest that the menus at isolated bases should be any different from those at main bases in Alaska. There was some indication that personnel at Alaskan bases as a whole had higher preferences for steak and pizza than did those in the Continental U.S. Preference study. Men at isolated bases reported slightly higher preferences for foods in general although they tended to rank foods in similar order as did men at the control bases.

Food service consumers rated the food systems from which they subsisted. There was no clear separation between isolated and control bases on many food service variables. Consumers had opinions of the food service at each base which were location specific. Personnel at Shemya and Elmendorf indicated dissatisfaction with the speed of service, food quality, and food variety. Food variety was a general problem, and increased meat variety was viewed as important to most Air Force personnel. The desire for more variety in all food classes was present on all bases to varying degrees. Most respondents indicated that they would prefer a varied menu to one which contained only a few items which they liked very much.

Many in the sample indicated that they had decreased their food intake in Alaska, while a smaller proportion cited an increase. When asked why they had been eating less, on the average personnel at Shemya and Elmendorf cited poor food quality more often than did those at other bases in Alaska. Across both isolated and control bases the most frequent reasons for eating less were poor food quality, a repetitive menu, and boredom.

When asked if they were getting enough to eat, Shemya, Eielson, and Elmendorf personnel indicated that at least some of the time they did not obtain enough food. The major area of concern about quantity at all bases was the small size of the meat portions. On the other hand, it was generally reported that portion sizes of starches were overly generous.

In addition to assessing customer satisfaction, food preferences, and personality pattern in Alaska, job satisfaction of food service workers was samples using the Job Description Index (JDI). The JDI measures satisfaction in five areas of a job: Type of Work, Pay, Opportunity for Promotion, Supervision and Co-workers. Forty-eight food service workers at one main and five isolated bases participated in this phase of the study. A pattern of responses across the scales of the JDI indicated that workers in Alaska, irrespective of isolation or lack of isolation, were relatively more satisfied with their supervision and co-workers, and less satisfied with pay, promotions, and the work itself. Only the promotions scale showed statistically significant differences between locations, with workers at Shemya and Murphy Dome being least and most satisfied respectively. Correlations between customer food service ratings and mean JDI scores indicated some significant relationships between the food service as perceived by consumers and worker satisfaction in areas of pay and the work itself. It is suggested that changes desired to increase the food service worker job satisfaction should concentrate on the work itself since pay and promotions are at best only marginally under local control.

This report concludes that a different menu is not necessary at Alaskan isolated sites. However, it forcers attention on the overall Air Force food service systems in Alaska. These systems will be the subject of a requirement in FY79 DOD Food RDT&Eng Program (USAF 9-6). The strong consumer opinions at certain bases on certain issues confirm that such a study is needed.

PREFACE

The authors wish to express appreciation to the U.S. Air Force personnel who made this report possible, specifically the men of the isolated and control bases which we visited, and COL Norman Heidelbaugh, USAF Representative on the Joint Technical Staff, DoD Food RDT&E Program. Appreciation is also due to Dr. (CPT) R. Curtis Graeber, U.S. Army, who helped gather the data. Finally, we must express our deepest thanks to Ms. Nancy Cobean and especially to Mr. Peter Priori, our computer programmers, without whose help the mass of data which we collected might never have been analysed.

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THE MEASUREMENT OF FOOD ATTITUDES AND PERSONALITY CHARACTERISTICS OF US AIR FORCE PERSONNEL IN ALASKA

INTRODUCTION

The study of men in isolation has come about in a rather indirect manner. Men have gone to isolated places generally to study something else, usually involving the physical sciences or military operations. It was only after they arrived at their destinations and began living there, that the first hints of potential psychological implications appeared. These hints were initial descriptions at the anecdotal level by non-behavioral scientists who had the opportunity to experience and observe each other under isolated circumstances (Gunderson, 1973).¹ The real life hazards -- some which are relevant even in today's modern technological world -- added color to their descriptions, but often overshadowed distinct analysis of interpersonal and intrapersonal dynamics. Scant mention was ever made of food service except from a logistical point of view.

It was rumored that when Byrd went to the Antarctic in the 1920's, he took along two coffins and a dozen straight jackets (Mullin, 1960).² While they turned out to be unnecessary, this was indicative of the respect which experienced explorers held for the physical and psychological risks of an extreme and isolated environment. Radloff and Helmreich (1968)³ saw a certain commonality across all isolated situations but more so when personnel were actually in a field setting. Laboratory analogies to isolation were just that -- analogies. They did not carry the full spectrum of environmental hazards and discomforts. A laboratory research participant has every reason to believe that no permanent harm can befall him.

In military and scientific isolated field settings, the same belief is not justified. Working and subsisting in either the Arctic or the Antarctic can be stressful experiences; and although each has unique properties, there is a commonality of reward-cost balance which can leave participants with varying degrees of tension and satisfaction. In this

¹Gunderson, E. K. Psychological studies in Antarctica. In. O. G. Edholm & E. K. Gunderson (Eds). *Polar human biology*. New York: William Heineman Medical Books, 1973.

²Mullin, C. S. Some psychological aspects of isolated Antarctic living. *American Journal of Psychiatry*, 1960, **117**, 323-325.

³Radloff, R. and Helmreich, R. *Groups under stress, psychological research in Sealab II*. New York: Appleton, 1968.

introduction, an overview of research on isolation will be presented. It will examine research done on both earth poles, especially Antarctica, where much of the psychological work has been done. It will become evident that very little data have been collected which related to the major emphasis of this report, food behavior and its correlates.

Studies of adaptation to the Antarctic are legendary. According to Gunderson (1973) the first group to spend a winter in Antarctica was the crew of the ship *Belgica* with a Belgian scientific party and the famous explorer Amundsen as the first mate. Men reportedly suffered from homesickness, boredom, "mental disturbances", exhaustion and the dietary deficiency of scurvy. Early studies of men in isolated climates were limited to observations by medical officers who had no formal behavioral science experience.

Medical studies were begun with Byrd's latter expeditions and with a Norwegian-British-Swedish expedition that took place from 1949 through 1952. These studies included a cursory examination of food consumption from a medical viewpoint.

It was during the International Geophysical Year (1957-1958), when many nations came to Antarctica, that some psychological studies were begun at US and allied stations. While there were differences in orientation and methodology, a general program of research was generated with certain common goals. These included personnel selection, performance criteria development, and the assessment of the effects of the isolation experience.

The most prolific and visible work in this area has been done by Gunderson and his colleagues at the Naval Medical Neuropsychiatric Research Unit in San Diego, California (Gunderson, 1973; Gunderson, 1965;⁴ Shears & Gunderson, 1966;⁵ Gunderson & Nelson, 1966;⁶ Doll, Gunderson, & Ryman, 1969;⁷ Gunderson, 1975).⁸ These researchers were primarily interested in selection criteria and their validation for personnel being assigned

⁴Gunderson, E. K. The reliability of personality ratings under varied assessment conditions. *Journal of Clinical Psychology*, 1965, 21, 161-164.

⁵Shears, L. M. and Gunderson, E. K. Stable attitude factors in natural isolated groups. *Journal of Social Psychology*, 1966, 70, 199-204.

⁶Gunderson, E. K. and Nelson, P.D. Criterion measures for extremely isolated groups. *Personnel Psychology*, 1966, 19, 67-80.

⁷Doll, R. E., Gunderson, E. K., and Ryman, D. H. Relative predictability of occupational groups and performance criteria in an extreme environment. *Journal of Clinical Psychology*, 1969, 25, 399-402.

⁸Gunderson, E. K. Introduction: psychological studies in Antarctica (TR 71-14), Naval Health Research Center, San Diego, California, 1975 (NTIS No. AD-A009450).

to US stations. This was of primary concern because many of these individuals would have no redress for seven months during the Antarctic winter when transportation from remote stations was impossible. The goal was to identify relevant variables and develop effective prediction systems. Three critical attitude areas were identified: 1) task motivation, 2) emotional stability, and 3) social compatability. It was demonstrated that predictions made for various occupational groups, for example, civilian scientists versus Navy enlisted men, were group specific. Navy enlisted personnel generally tended to show more negative attitudes especially near the ends of their tours. Job satisfaction was related to occupational status. Performance criteria were developed using a composite rating of peers and supervisors for each individual on a station. The complexity of attitude assessment and performance evaluation in isolated field settings was well demonstrated. One of the clearest indicators of an individual's success in Antarctica was the number of times he was chosen by his peers when the following question was asked: "List those men you would most want to serve with again in Antarctica."

Taylor (1969)⁹ described work done at Scott Base (a New Zealand operated installation). Personnel selection was based primarily on interview techniques with emphasis placed on finding technically qualified people who liked outdoor types of activities and had adequate physical ability. These selection procedures compared to those used by the earliest explorers and were successful. Testing served the New Zealanders primarily as an initial screening device. Taylor employed an open-ended questionnaire and Cattell's 16 PF to try to determine the effects of isolation and concluded that personnel did not change markedly because of their isolation experience, and in fact bore up rather well. This result was confirmed in another study by Taylor and Shurley (1971).¹⁰

Mullin (1960) used a series of interviews with 85 men nearing the end of their Antarctic tour. He identified three main sources of stress in that isolated situation: 1) individual adjustment to the group, 2) the sameness of the surroundings, and 3) the absence of many normal sources of gratification. Palmai (1962)¹¹ cited these same three, but to the last one he added the lack of sources of gratification both from the sexual and the gastronomical areas. Mullin (1960) found that the danger, hardship, and the

⁹Taylor, A. J. Ability, stability and social adjustment among Scott base personnel, Antarctica. *Occupational Psychology*, 1969, 43(2), 81-93.

¹⁰Taylor, A. J. and Shurley, J. T. Some Antarctic troglodytes. *International Review of Applied Psychology*, 1971, 20(2), 143-148. (Abstract)

¹¹Palmai, A. *Psychological aspects of transient populations in the sub - Antarctica*. World Health Organization, Conference Document, 23, 1962.

cold were not as extreme as the men had anticipated; and that, although present, interpersonal hostility was rarely expressed overtly. This latter finding was similar to that cited by Radloff and Helmreich (1968) in their study of Sealab II. The men interviewed by Mullin indicated that their "appetite and food consumption were enormous and weight gains of 20 to 30 pounds were not unusual (p. 325)." If the station cook was perceived as good, he was accorded high prestige. Mullin interpreted the appetite increase in psychoanalytic terms citing enhanced "oral" needs based on unexpressible tensions and absence of other gratifications.

A study by Gjurie (1974)¹² supported Mullin's contentions of the significant stressors under an isolated environment. Gjurie used psychological tests, questionnaires, sociometry, interviews and observation to select applicants for a geological expedition to Mongolia. Contrary to expectation, the physical hardships and deprivation were not significant stressors. The individual's personality dispositions and characteristics were more relevant to how well he weathered the situation than were the environmental stressors.

Waybrew (1963)¹³ felt that adjustment to a closed environment was primarily a function of how well personal and group motives and the needs on which they were based were satisfied by the goal opportunities available. Burns and Kimura (1963)¹⁴ indicated that an organism's behavior in isolation was a function of an attempt to maintain some level of arousal. Ruff (1963)¹⁵ viewed isolation as a system with lowered informational input, and part of coping was to seek meaningful stimulation. Burns and Kimura (1963) spoke about the importance of scheduled meals in a traditional laboratory isolation experiment. The scheduling rather than the food itself could help the participants structure an otherwise open environment and provide some idea on the passage of time.

¹² Gjurie, A. (Geoindustria, Nardoni, Podnik, Prague, Czechoslovakia). Data on selection and follow-up of a small group working in conditions of natural stress in an expedition abroad. *Ceskoslovenska Psychiatric*, 1974, 70(3) 200-202, (Abstract).

¹³ Waybrew, B. B. Psychological problems of prolonged marine submergence. In N. M. Burns, R. M. Chambers, and E. Hendler (Eds), *Unusual environments and human behavior*. London: Free Press of Glenloe, 1963.

¹⁴ Burns, N. M. and Kimura, D. Isolation and sensory deprivation. In N. M. Burns, R. M. Chambers, and E. Hendler (Eds), *Unusual environments and human behavior*. London: Free Press of Glenloe, 1963.

¹⁵ Ruff, G. Psychological and physiological indices of stress. In N. M. Burns, R. M. Chambers, and E. Hendler (Eds), *Unusual environments and human behavior*. London: Free Press of Glenloe, 1963.

It has already been noted that there are distinctions between field isolation and its laboratory analogues. One of the most extreme forms of isolation in a real setting is submarine submergence. It differs from service in the Arctic and Antarctic in that the duration is generally less, the crowding more extreme, the breathable atmosphere highly controlled, and recreational activities very restricted. Also the hazards are immediate and extreme. According to Waybrew (1963) headaches are frequently reported during prolonged submergence. Measures of motivation tend to show a decrement as did those taken by Gunderson and his colleagues on Naval personnel in Antarctica. A submarine environment would not be referred to as being sensory deprived. If anything, there is generally an excess of background noise, odors and social interaction. A great deal of research has been done on selection of candidates for submarine service. Volunteerism has been a primary criterion. Waybrew (1963) indicated that personnel volunteer because of the satisfaction of belonging to a close-knit, high-status group. In contrast to this, it should be noted that Air Force personnel in Alaskan isolated assignments are not volunteers. A study by Youniss (1956)¹⁶ demonstrated that men volunteered for submarine service for the pay, the opportunities to learn new skills, and for the good food, which was supposed to be of legendary quality and quantity.

In contrast to the food orientation of submarines, Radloff and Helmreich (1968) reported that food was far from a major source of gratification to a group of saturation divers residing in Sealab II, two hundred feet below the surface of the Pacific ocean for two weeks. The duration of their stay was very short, however, and they had an extremely busy schedule in contrast to Arctic and Antarctic personnel who had some free time. The environment in Sealab II was a helium-oxygen mix, which was regenerated. Therefore, food could not be broiled, fried or roasted, because that would have contributed toxic particulate matter to the atmosphere. Much of the meat was eaten directly out of cans. There were no designated cooks. It is understandable why the importance of food to these men was devalued. They were members of a highly visible program and derived a great deal of satisfaction from the work itself and their opportunity to participate. Visibility, media coverage, and public plaudits are seldom characteristic of more commonplace isolated service. Sealab II members did indicate that more food variety would have been desirable, but most often meals were eaten as a bothersome necessity. Radloff and Helmreich (1968) built a reward-cost model of motivation to participate in high stress environments. While the rewards and costs (dangers, hardships) are low in laboratory studies, they can be extremely high in field work. Rewards are often subjective and based on the individual's perceptions of his potential immediate and long term gains from the situation. For example, many of the divers in Sealab II felt that their participation in such a landmark project would be career enhancing.

¹⁶Youniss, R. P. *An investigation of motivation for submarine duty.* USN Medical Research Laboratory, Nov. 1956, 15(7, whole No. 278).

This model is supported by a study done in the Arctic Air Force remote radar sites (Sells, 1965),¹⁷ which attempted to explain differences in morale and performance across the various sites. Eighteen sites were examined using questionnaires, peer nominations, and participant observers. It was found that bases with higher morale had commanders who maximized the rewards available within the environment. The potential costs to personnel at the various bases were very similar; good leaders therefore manipulated reward systems. Examples of effective leadership behavior included setting the example, recognizing and praising effective work, emphasizing training, and not allowing too much free time. Another finding particularly relevant to this current report was that sites with high morale made provision for the availability of food and coffee twenty-four hours a day.

Manning and Sells (1963)¹⁸ studied interpersonal interaction of men assigned to Alaska isolated duty at radar sites. The installations that they sampled included four of those samples in this report: Cape Newenham, Tatalina, Murphy Dome and Fort Yukon. The study described the interaction of various task groups one of which was service. Unfortunately, data was not reported separately for this group.

Seaton (1962)¹⁹ described a classic study of group oriented performance under conditions of isolation and food deprivation in an Arctic environment. He employed a wide spectrum of psychometric, physiological, attitudinal, sociometric, and performance rating measures. Non-volunteer Army personnel were required to perform the tasks of "movement hauling eight miles per day and self and group maintenance on the Greenland Ice Cap while alternately under conditions of adequate and deprived nutrition. Food consisted of Meals, Combat Individual Field rations (MCI), and it was found that those on restricted nutrition (2400 calories per day) increased their preference ratings for various ration items. Their performance improved as they adapted to the climate and the workload. When participants were on a full Arctic diet of 4800 calories, they rarely consumed all the food available even under difficult physical conditions. However, all participants reported themselves to be at least moderately hungry. Sociability, defined as the frequency

¹⁷ Sells, S. B. *Research report on leadership and organizational factors in effective A.C. and W sites.* (Contract No. AF41(657)-323). Arctic Aeromedical Lab, Institute of Behavioral Research, 1965.

¹⁸ Manning, W. B. and Sells, S. B. *Military small group performance under isolation and stress: an analysis of sociometric indices of group interaction at Alaska AC and W sites.* TDR-63-41, Arctic Aeromedical Lab, Ft. Wainwright, Alaska, 1963. (NTIS No. AD614825)

¹⁹ Seaton, R. W. *Hunger in groups: an arctic experiment.* (QMFCIAF Report No. 34-62). Chicago: Quartermaster Food & Container Institute for the Armed Forces, August, 1962.

of verbal interaction between group members, declined significantly for the underfed groups. Using two attitude surveys, the "Attitude Study" and the "Group Behavior Description" employed extensively by other investigators in the Antarctic, Seaton (1962) found that hungry groups showed a significant decline in terms of positive feelings of the members toward each other. Group task organization and goal satisfaction also declined. Seaton's study was an example of an experimental analogy carried into a field setting. It was more generalizable than a laboratory experiment but less so than studies conducted with working groups in realistic settings. The reward cost balance of the men in the Seaton study was heavy on the cost side of the ledger in that they were not volunteers, nor were they in the experiment because of their professionalism as were the Navy divers of Sealab II. There were some risks involved, but not to the extreme of Sealab II or that of Antarctic assignments. Finally, even with a full arctic ration of 4800 calories per day, their diet was at best tedious and not directly comparable in terms of overall acceptability to kitchen prepared food at isolated bases and in submarines.

Seaton's work was in the Arctic, which makes it unique with respect to the vast amount of work that has been done in the Antarctic. Further, its major orientation was on the effects of nutrition differences, while most other isolated psychological work has been concerned with selection, training and environmental adaptation.

The participants in Seaton's experiment spent only a matter of weeks in the Arctic environment. Men assigned to Alaskan isolated radar installations may spend a year or more in a fairly hostile environment. During World War II, Alaska was opened up to exploration through many military operations. Garfield (1969),²⁰ writing about those times, stated that "Ladd Field and Elmendorf Air Force Base were the country clubs -- from there the quality of life deteriorated in geometric ratio to the westward distance (p. 213)". He was speaking about operations in the Aleutian Islands, but his observations could have held for all the remote assignments of the time. Supply was a real problem, and hunger was often present. Satisfaction from canned C rations, when they were available, quickly diminished.

Even today, supply to remote areas is a problem. On many remote bases there is not a question of hunger, however, because food of some kind is generally available. There is rather a question of the quality of life and the place of food in the general morale structure. Troop attitudes toward food are often used as indicator of morale. According to Sells (1965) the better commanders maximized the rewards they had available. Changes in deficient food systems may be employed to improve morale and perhaps unit performance. The Air Force has established a requirement to study isolated food service and the Behavioral Sciences Division of the Food Sciences Laboratory, U.S. Army Natick Research and Development Command has designed the following study.

²⁰ Garfield, B. *The thousand mile war*. New York: Ballantine, 1969.

METHOD

Concept: The purpose of this study was to assess food behavior and related variables which were applicable to food service at isolated locations. An isolated base was operationally defined as one in a remote location, either inaccessible by conventional travel (i.e., private auto) or in one case accessible only with extreme difficulty. The isolated bases were to be as far from any supporting civilian community as possible and receive all their logistical support, especially supplies of food and food service equipment, from Air Force stocks. Nothing in that area of supply was to be locally procurable. There were several factors confounding these definitions. First, once our research team reached Alaska it was found that not all bases we had selected were actually accessible with any hope of return within a reasonable time frame due to the weather conditions. So substitute bases had to be chosen which did not always meet the criteria perfectly. One base, Ft. Yukon, was located next to an Indian village. Another base, Murphy Dome, was approximately thirty miles from Fairbanks, a large community by Alaskan standards. The roads were so hazardous in winter that personnel tended to stay on base rather than to attempt the trip, and the tour was unaccompanied.

Control bases were selected to establish baseline information. These bases were chosen in Alaska also so that they would be as similar as possible to the isolated bases in all respects except for the isolation itself. What follows is a capsule description of each base.

Description of Bases Sampled:

Control Bases:

1. **Elmendorf AFB** is a large installation with virtually all services and supplies that can be made available in Alaska. It is located within an easy drive to downtown Anchorage, the largest city in the state. Elmendorf is the Air Force Supply Center for Alaska.
2. **Eielson AFB** is the second largest AF base in Alaska located thirty miles from Fairbanks. Although close to the city, personnel tend to remain on the base which has all necessary facilities. Like Elmendorf, Eielson is an accompanied tour for married personnel.

Isolated Bases: Note that all these bases are unaccompanied tours except in the rare case where both marital partners are on active duty and are assigned to the same base.

1. **Cape Lisburne** is a small, self-contained 80-man station on the northwest coast approximately 700 miles from Anchorage. The base is accessible only by air for most of the year and by sea in the spring. Seven men reside in a Top Camp to maintain the radar equipment. They have their own cook and

dining area while the remainder of the men eat in the main dining area at the base camp. All general morale services (i.e., library, hobby shops, movies) are available. The weather is extreme and hazardous.

2. **Tatalina** is an approximately 125-man station located in a valley northwest of Mt. McKinley about 20 miles from the town of McGrath. The station is not accessible by land and must be reached by bush aircraft. Thirteen men live in the Top Camp. Those in the Bottom Camp have the usual array of morale services. Environmental hazards include severe weather and not infrequent visits by bears.

3. **Fort Yukon** is a small 85-man base located 130 miles north, northeast of Fairbanks at the site of a former Hudson Bay Company trading post. Although located about one mile from an Indian village, most personnel do not frequent the civilian community. The base is accessible primarily by aircraft. The weather is not as extreme as at other isolated sites.

4. **Camp Newenham** is a small 80-man station located on the Bering Sea about 150 miles south of the town of Bethel. The site is situated within a National Wildlife Preserve and is very isolated and accessible primarily by air. Nine personnel live in the Top Camp with their own dining facility. The weather is very extreme, often isolating the Top Camp. There is the usual range of morale activities. The base camp video tape TV system was inoperative when our researcher was there.

5. **Shemya**, unlike the other isolated bases on the mainland, is an island in the Aleutian Chain about 1400 miles west of Anchorage. It is accessible only by air (and seasonally by supply barge). The island is 2 by 4 miles of tundra without any trees and it gives the general impression of extreme isolation. Shemya is a large base, having a military strength of about 600 at the time of this research. There are also many civil service and civilian contractors on the island. Most personnel eat in a very large dining facility in the main building. Although it does not become extremely cold, environmental hazards include high winds and the ever-present danger of earthquakes.

Participation Selection: At each base which we visited, the Commander or his designated deputy was briefed on the nature of the mission, including the purpose and the nature of the research and what the results could mean to isolated bases in terms of improved food service systems. The Commanders were asked to provide us with a place to survey that was quiet and well-lighted. Further, we asked that they send us a representative group of personnel over several days time that would cover the paygrade and specialty spectrum. The demographic description presented in the results section of this study shows the sampling outcome.

Many commanders and section chiefs may have been somewhat reluctant to release individuals who were mission essential. The individuals sampled were those who could be spared by their supervisors. The effort to avoid interfering with the operations of the sampled organizations detracted from the quality of the sampling technique. This was a trade off between operational necessity and research imperative.

Survey Construction/Test Selection: Pilot studies had been done on the attitudes of personnel returning from isolated assignments and currently passing through the Headquarters of the Air Force Communications Command, Kelly AFB, Antonio, Texas. The purpose of these studies was twofold: first, to test possible item formats and, second, to evaluate the possibility that the data could be collected without having to go to the remote sites themselves. The first objective was met in that variability and demonstrated on such items as: rate your present or most recent isolated food service on a) expense, b) hours of operation, c) food quality, d) food quantity, e) food variety, and f) speed of service. There was evidence that respondents believed that isolated food service was inferior in many ways to that of main bases. It became apparent that answering such questions would require actually visiting and surveying both isolated and control sites.

A food preference inventory was also piloted at San Antonio using 80 foods selected from actual menus at CONUS isolated sites, including those of the Minuteman and Titan Missile Programs. Next to each food listed in the pilot survey were columns for marking "never tried", a nine-point hedonic scale from **dislike extremely** to **like extremely**, and a preferred frequency score (0 — 30 days per month). Individuals were also asked whether they would add or remove a given food item from the menu and whether they would prefer it either on or off isolated duty.

Using these pilot efforts and interviewing done with personnel returning from isolated assignments, it was decided to develop a battery consisting of a food preference inventory and a survey geared toward the evaluation of the food service system at each base which was sampled. In addition we intended to collect as much relevant data as possible to include employing to a general personality inventory and a food service worker job satisfaction questionnaire.

The "Food Preference Survey" was designed using recent menus sent to us from the Food Service Systems Office of Elmendorf. Foods were selected from lists of what was available in Alaskan isolated bases and also based on previous research done by the Food Sciences Laboratory, NARADCOM (Meiselman, Waterman and Symington, 1974).^{2 1}

^{2 1} Meiselman, H. L., Waterman, D. and Symington, L. E. *Armed Forces food preferences*. (TR-75-63-FSL) U.S. Army Natick Development Center, Natick, MA: Food Sciences Laboratory, 1974.

The results of this research were employed so that surveyed foods would have a wide spectrum of acceptability based on previous large sample hedonic ratings. The inventory consisted of one hundred items, one of which was a control food, "braised trake". The purpose of this item was to check for the tendency to respond without consideration of item content. The format for the questionnaire involved the numbered food item, followed by "never tried", hedonic, and isolated versus non isolated columns. Table 1 is a capsule view of this format, which can be seen in detail in the Appendix.

TABLE 1

Food Preference Questionnaire Format

Food Item	Never Tried	How much do you like or dislike the food (Circle Number)								I like this food more when		No Difference
										ON Isolated Duty	OFF Isolated Duty	
Three Bean Salad		1	2	3	4	5	6	7	8	9		

The "food service questionnaire" was designed to collect a great deal of reliable information in the shortest administrative time possible. The items were written and screened for readability by the average military participant and also designed for simplicity of physical layout. The information sought included: individual demographic characteristics, meal patterns, isolated versus non-isolated food service comparisons, current self-perceived intake in comparison to the individual's previous assignment, and also the individual's evaluation of the current food service, quantity, and variety. This questionnaire can be seen in detail in the Appendix. The questions were preceded by a page of explanation, detailing how to fill out the items, especially the multipoint rating scales, and the fact that the questionnaire was "not a test" but only sought "honest opinions".

It has been rather traditional when seeking consumer related information to orient one's efforts on the product or service and in essence not examine the consumer for his own sake. Perloff (1964)²² proposes that it is important to "study the consumer for the sake of understanding consumer behavior because consumer behavior is scientifically

²² Perloff, R. Potential contribution of the consumer oriented psychologist, *Business and Society*, 4(2), 1964, 28-34.

important on the one hand, and is relevant to helping the consumer derive greater satisfaction and pleasure from the products he consumes, on the other." The concept of looking at the consumer led us to the decision to examine personality structure of the personnel in isolation. Several criteria were set for the selection of an adequate inventory. It had to be well founded in the experimental literature and standardized on a broadly based sample. It had to be readily readable by our target population and have demonstrable ease and speed of administration. We required a wide spectrum instrument capable of covering the greater part of the range of what is traditionally conceived of as "normal" personality.

The 16 Personality Factor Questionnaire, Form C (16 PF) by Cattell (1969),^{2,3} published by the Institute for Personality and Ability Testing was chosen as having best met our criteria. The test consists of 105 items which can be administered in about one-half hour. It has the additional advantage of being machine scorable. The nature of the items and scoring procedure will be discussed in a later section. The test itself will not be included in the Appendix because ethical standards require that it receive limited distribution.

In addition to the data collected in written format, an interview protocol was constructed and administered to about ten percent of those surveyed at each base. The interview was designed to acquire three kinds of information: Confirmation of survey answers, broad spectrum analysis of the food service system, and the emotional impact of the isolation situation.

In addition, we had decided to examine job attitudes of the food service workers themselves at the isolated bases and at one control base. To do this we selected the Job Description Index (JDI) by Patricia Smith of Cornell University. Precedent for the use of this instrument with military food service workers had been set by other studies conducted by researchers at the Food Sciences Laboratory, U.S. Army Natick Research and Development Command (Siebold, Symington, Graeber, and Maas, 1976;^{2,4} Symington and Meiselman, 1975;^{2,5} Siebold, Symington, Meiselman, and Rogozenski, 1975).^{2,6} The

^{2,3} Cattell, R. B. *16 PF Questionnaire Form C*, Champaign, Ill: IPAT, 1969.

^{2,4} Siebold, J. R., Symington, L. E., Graeber, R. C., and Maas, D. L. *Consumer and worker evaluation of cash food systems: Loring Air Force Base (Part I)* (TR 76-35-FSL). U.S. Army Natick Research & Development Command, Natick, MA: Food Sciences Laboratory, 1976.

^{2,5} Symington, L. and Meiselman, H. L. *The food service worker and the Travis Air Force Base experimental food system: Worker opinion and job satisfaction*. (TR 75-94-FSL). U.S. Army Natick Research & Development Command, Natick, MA: Food Sciences Laboratory, 1975.

^{2,6} Siebold, J. R., Symington, L. E., Meiselman, H. L., and Rogozenski, J. E. *Consumers and workers opinions of a proposed cash food system: NAS Alameda* (TR 76-9-FSL). U.S. Army Natick Research & Development Command, Natick, MA: Food Sciences Laboratory, 1975.

JDI will be described in detail in a later section of this report. It was administered to those workers who were available at isolated bases and also to a sample at one control base (Eielson AF3).

Administration: A key problem with the administration of multiple questionnaires to individuals is the matching across the instruments if required for subsequent data analysis. Since collecting the participants' names and/or social security numbers would have required several steps in compliance with the Administrative Privacy Act of 1974, it was decided to assign each participant an arbitrary 3 or 4 digit number which was presented to him on a wallet size card, an example of which is shown as Table 2.

TABLE 2

<p>Survey ID Card</p> <p>U.S. Army Natick Development Center (USA NDC)</p> <p>Food Sciences Laboratory</p> <p>Individual's Survey Identification # _____</p> <p>Please keep this card. This number insures the privacy of any information you provide our researchers. If you need to contact us at any time, call Autovon 955-2174 or 2962.</p>
--

NOTE: Since this study was completed, there has been a name change to the U.S. Army Natick Research and Development Command.

No records were kept which could associate Survey ID numbers with the identities of the participants. They were instructed to record this number on all forms which were filled out. The administration of the surveys and 16 PF was accomplished in rooms including libraries and conference rooms, but primarily dining facilities during non-mealtime hours. Conditions were generally good with adequate work-space and lighting. There was generally some non-survey related activity going on which could not be avoided, but this was not of a highly distracting nature. Participants were briefed on the nature of the research and its importance to isolated food service. The confidentiality of their responses and their individual anonymity in the study were also stressed. Participants were given enough information so that they could be informed voluntary participants in the study. A special fact sheet explaining the 16 PF was presented and they were encouraged to read it while it was explained by the researcher. No pressure was placed on anyone to participate and, to the best of our knowledge, after being briefed, no one refused. Many verbalized interest in the study and assured researchers that they wanted to help improve the food systems.

The two surveys were presented in a block which was given alternately first and last in relationship to the 16 PF. This was done to counterbalance fatigue and other

nonrelevant response effects across the two general types of measures. The two surveys were not split across the administrative sequence, because it would have required the participants to change orientation too often, from food to personality variables.

RESULTS AND DISCUSSION

Selected Demographic Data: Selection of samples for surveys and interviews did not permit proper stratification of the sample. In other words, precise determination of the percentage of ranks, ages, etc. in both isolated and non-isolated samples was not possible. In fact, there was some problem in simply guaranteeing an adequate sample size. This is typical of sampling in an organizational environment where operational requirements take precedence over research data collection (Radloff and Helmreich, 1969).²⁷

The demographic data for the isolated and control bases are shown in Table 3. The isolated base samples were older and more senior in rank than the control samples from Eielson and Elmendorf AFB's. This is to be expected from the missions of the isolated and non-isolated sites. The control bases had a higher percentage of younger, less senior, and less highly trained individuals with 3.04 average years of service, while isolated bases had older, more senior, and highly trained individuals having 7.80 average years of service, as especially required for the radar related functions. Hence, 49% of the control sample are ages 18-21 as compared with only 16% of the isolated sample. Also, 39% of the isolated sample is age 30 or over, as compared to only 2% of the control sample. The same distribution applied to rank. Although the modal rank for both isolates and controls was E4, 47% of the controls were E1-E3 as compared with 14% of isolates.

Respondents were asked how long they had been at their present assignment, isolated or non-isolated. The modal or most frequent, response was 2-3 months (18.9%) for the isolated and 0-1 month (14.7%) for the non-isolated subjects. This suggests the possibility that newcomers, especially at the control bases, were sent to the survey out of proportion to their actual percent of the overall population. Naturally, very few of the isolated sample reported times over 12 months. Also, from 16% to 18% of the isolated sample was drawn from those serving 5 or fewer months, whereas those serving 6 to 12 months constituted from 0.3% to 18%. Again it is unclear what bias is involved.

When asked how many previous isolated duty tours they had taken, zero was the modal response from both isolated (65%) and non-isolated control (90%) groups. However, 23% of the isolated sample had been on one previous isolated tour, as compared with 7% of the controls, and 10% of the isolated group had been on two previous isolated tours, as compared with 1% of controls. Hence, the two groups not only differ in that one is on isolated duty at the time of the study and one is not, the groups differ in their history of isolated duty. This may be a function of the fact that those in certain skill groups are more likely to be sent to isolated duty.

²⁷ Radloff, R. and Helmreich, R. Electronic data collection in field research. *American Psychologist*, 1969,

TABLE 3

Demographic Characteristics of the Sample

Variable	Isolated		Control	
	Rank	Freq	Freq	%
Officers		22	5	2.6
E-1		2	1	.5
E-2		7	23	12.1
E-3		35	65	34.2
E-4		105	82	43.2
E-5		76	13	6.8
E-6		40	1	.5
E-7		15		
E-8		8		
E-9		1		
Age	Isolated		Control	
	Freq	%	Freq	%
18-19	10	3.2	26	13.7
20-21	40	12.9	68	35.8
22-23	64	20.6	56	29.5
24-25	43	13.8	17	8.9
26-27	30	9.6	13	6.8
28-29	21	6.8	6	3.2
30-31	22	7.1	3	1.6
32-33	24	7.7	1	.5
34-40	44	14.1		
40-47	13	4.2		

Demographic Characteristics (Cont'd)

Previous Isolated Tours

Number	Isolated		Control	
	Freq	%	Freq	%
0	203	65.3	171	90.0
1	72	23.2	13	6.80
2	30	9.7	2	7.7
3	6	1.9	1	.53
4	0		1	.53
5	0		0	
6	0		1	.53
7	0		0	
8	0		1	.53

Months on Current Tour

Number	Isolated		Control	
	Freq	%	Freq	%
0-1	50	16.3	28	14.7
2-3	58	18.9	21	11.1
4-5	56	18.2	20	10.5
6-7	57	18.6	22	11.6
8-9	39	12.7	14	7.4
10-11	41	13.4	19	10.0
12-13	5	1.6	17	8.9
14-15	1	.3	10	5.3
16-17			14	7.4
18-24			17	8.9
25-30			6	3.2
31-36			1	.5
37+			1	.5

Personnel were asked (Question #7) whether they received separate rations or not on a normal accompanied type tour. The following table indicates that about half of the control members were on a separate rations allowance while most of the isolated personnel had received separate rations previously to their isolated assignment. This relationship was significant (1).* It probably reflects the fact that isolated men being more senior and experienced had more frequently reached that point in their careers (and/or marital status) at which they could collect separate rations. While this might have produced some bias in the isolated vs. control group relationship, it is not necessarily unique to the sampling technique, but was predetermined in part by the requirements for a high level of experience at isolated bases. The majority (88.6%) of those men who said they did not receive separate rations on a regular tour indicated that they subsisted in military dining facilities.

TABLE 4

Do You Ordinarily Receive Separate Rations (Frequencies)

Group	Answer Frequencies	
	YES	NO
Non-isolated	80 (45%)	96 (55%)
Isolated	189 (74%)	65 (26%)

Meal Patterns: Two questions (#10 and #11) at the beginning of the food service questionnaire asked individuals to indicate when they ate their meals and snacks. Rather than examining the specific time, frequency analysis was applied to the main meals of the day for weekdays and weekends. A comparison was made for each base between Question #10 which asked for the meal patterns of people on their last assignment (non-isolated for those currently isolated) and Question #11 which requested information on current meal patterns.

Chi Square analyses on the reported meal patterns are summarized in Table 5. As can be seen, at most bases individuals did not report any marked change in meal patterns from the previous to the current assignment. The only exceptions to this rule were Elmendorf and Cape Lisburne personnel who indicated a frequency change on weekends.

*See the significance of statistics in Table A-1.

TABLE 5

Chi Square Analysis of Current and Past Meal Patterns

Location	Weekday	Weekend
Eielson	1.37	1.22
Cape Lisburne	0.92	7.02*
Ft. Yukon	0.74	0.94
Shemya	0.90	4.22
Elmendorf	3.96	6.04*
Tatalina	2.35	2.79
Cape Newenham	0.54	4.89
Murphy-Dome	0.27	1.50

* $p < .05$

TABLE 6

Frequency Personnel of Reporting Meal Consumption on Weekends

Meal	Base	Elmendorf	Cape Lisburne	
	Past Assignment	Current Assignment	Past Assignment	Current Assignment
Breakfast	38	30	23	23
Lunch	88	74	23	11
Dinner	92	78	33	28

The significant changes in weekend meal patterns reported at these two bases can be seen in the contingency table (Table 6). It would appear that the changes amount to a decreased frequency of meal consumption at the current bases during weekends.

Personality Assessment Using The 16 Personality Factor Questionnaire Introduction:

Cattell's 16 Personality Factor Questionnaire is, as the title indicates, a measure of sixteen areas of an individual's personality structure. The instrument was initially developed in the late 1940's based on the premise that many of the common so-called personality traits then in use were actually labels for the same aspects of an individual's potential behavior. Guilford (1954)²⁸ pointed out that if we examined a dictionary for all the terms that related to human personality and ability, we would find literally thousands of concepts, many of which would overlap to one degree or another.

Cattell made use of a relatively new statistical technique developed by such men as Hotelling and Thurstone called factor analysis (Guilford, 1954). Factor analysis allows an investigator to look at the meaning of a test or trait concept by studying its correlations with other variables (Cronbach, 1970).²⁹ The advent of computers made this laborious procedure a realistic possibility. It can provide a test developer with what amounts to a series of more basic personality "dimensions". Around these dimensions Cattell designed a personality self-report questionnaire which could be administered individually or in groups. The instrument has been used for over a quarter of a century in both applied and basic settings. Much of this interlocking research has been designed to define what the test authors call source traits (factors) which go beyond paper and pencil measures and include "Life Data" from behavioral rating (Cattell, Eber, and Tatsuoka, 1970).³⁰ Some of these contentions are supported in part by the extensive reference lists cited in Cattell, et al. (1970) and in the test manual (The Institute for Personality and Ability Testing, 1972).³¹ However, the linkage between behavioral data and the 16 PF scores has not invariably been supported (Becker, 1960).³²

²⁸ Guilford, J. P. *Psychometric methods*. New York: McGraw, 1954.

²⁹ Cronbach, L. J. *Essentials of psychological testing*. New York: Harper, 1970.

³⁰ Cattell, R. B., Eber, H. W., and Tatsuoka, M. M. *Handbook for the sixteen personality factor questionnaire (16 PF)*. Champaign, IL: IPAT, 1970.

³¹ Institute for Personality and Ability Testing. *Manual for the 16 PF*. Champaign, Ill: IPAT, 1972.

³² Becker, W. C. The matching of behavior rating and questionnaire personality factors. *Psychological Bulletin*, 1960, 57(3), 201-212.

Concept: The 16 PF has been employed in an isolation context. Taylor (1969) reported 16 PF scores for personnel at Scott base in Antarctica. He found that most of the individuals at Scott, who were carefully selected professionals did not exhibit any extreme scores and apparently did not suffer any significant psychological changes from their experience of "wintering over". Francis (1969)³³ also examined 16 PF scores in relation to isolation in a more molecular context -- specifically for ability to tolerate water immersion. He found that those best able to handle this form of isolation were the more introverted on the introversion-extroversion scale.

Odell (1971)³⁴ has done basic research with the 16 PF and also has employed it to evaluate personality in relation to performance of Radar Controllers (Karson and Odell, 1971).³⁵ This latter research found negligible relationship between performance data and personality scores although minimal variance in performance ratings may have accounted for this. They noted that it is very difficult to develop selection measures on people who are already working well in their jobs.

The 16 PF has been employed to study compliance of institutionalized veterans (Reimanis, Krugman, and Lasky, 1965)³⁶ and also in a battery with the MMPI and the Edwards Personal Preference Schedule to examine differences between several groups of "sports stress seekers" (Johnsgard, Ogilvie, and Merritt, 1975;³⁷ Johnsgard and Ogilvie, 1968).³⁸ Porter (1970)³⁹ reported using the 16 PF as an aide in personnel selection. He found that predictions of success made by a consultant, using 16 PF scores and having no personal knowledge of the individual employees, were highly reliable against an employee rating system. It can be seen that the 16 PF has been used broadly in both civilian and military settings.

³³ Francis, R. D. Introversion and isolation tolerance. *Perceptual and Motor Skills*, 1969, 28, 534.

³⁴ Odell, J. W. Method of detecting random answers on personality questionnaires. *Journal of Applied Psychology*, 1971, 55(4), 380-383.

³⁵ Karson, S. and Odell, J. W. Performance ratings and personality factors in radar controllers. *Journal of Clinical Psychology*, 1971, 27(3), 339-342.

³⁶ Reimanis, G., Krugman, A. D., and Lasky, J. J. Compliance and non-compliance during long term institutionalization. *Perceptual and Motor Skills*, 1965, 21, 895-903.

³⁷ Johnsgard, K., Ogilvie, B., and Merritt, K. The stress seekers: a psychological study of sports parachutists, racing drivers, and football players. *Journal of Sports Medicine*, 1975, 15, 158-169.

³⁸ Johnsgard, K. and Ogilvie, B. C. The competitive racing driver. *Journal of Sports Medicine*, 1968, 8(2), 87-95.

³⁹ Porter, R. B. Test results as an aid in personnel selection. *Journal of Employment Counseling*, 1970, 7(1), 36-39.

This brief historical introduction demonstrates the types of use to which the 16 PF has been applied. Since this current report is concerned with food habits and attitudes at isolated Air Force Radar sites in Alaska, one might ask what relation if any does personality assessment have with food behavior.

Employing a measure of personality in a food habits study has not been frequently done. In an unpublished study Kamenetsky and Schutz (date not stated, location: Quartermaster Research and Development Command, Natick, MA) attempted to relate food preferences with personality traits using the Thurstone Temperature Schedule. They found a low relationship (less than 0.26) between personality and food variables. The authors noted that "temperament differences" were not the only source of variability in food behavior. In order to examine how much of Air Force personnel attitudes toward their food could be accounted for by personality variables, the 16 PF was administered. It was felt that the less important was personality to an individual's food attitudes, the more relevant were those attitudes and evaluations to the food system itself.

The 16 PF generates scores on 16 "primary factors" and on many second order factors of which 8 were scored for this research project. Scores are listed in bipolar fashion such that a low score means that the individual is more characteristic of whatever term is at the end of the scale, while a high score applies the same way to the other end of the scale. A typical profile for the 16 Primary Factors is presented in Table 7. All scores (stems) are reported in whole numbers and can be noted on a profile sheet as shown in Table 7. The marks on this sample profile were randomly entered, and it is only an example of how the data can be presented.

The reader will note that the stem scores range from 1 to 10 with an average score being 5.5. When an individual scores near the average on a factor, it indicates that his answers were similar to those given by the average person who participated in the standardization of the test.

Description of the Test: The 16 PF is available in multiple forms, the most common of which are Forms A or B and Forms C or D. Each of these two groups represents a pair of alternate forms of equal length and language difficulty. The test manual (IPAT, 1972) indicates that these forms are appropriate for "literate individuals whose education level is roughly equivalent to that of the normal high school student, (p. 6)". Forms C and D, however, are designed with somewhat simpler language and contain 105 items in contrast to the 187 in the longer Forms A and B. The shorter forms, although untimed, are expected to require only about 35 minutes to administer in contrast to about 50 minutes for Forms A and B. Forms C and D are recommended when time resources are limited and the "group ranges to lower educational levels" (Cattell, et al., 1970, p. 3).

The technical (psychometric) properties of the two-form pairs are comparable, and one author decided to use Form C in this study because of the speed of administration and the simplicity of language.

TABLE 7
16 PF
Personality Profile

		Sten Score									
Factor		1	2	3	4	5	6	7	8	9	10
1A	Cool, Reserved				x						Outgoing
2B	Less intelligent					x					More intelligent
3C	Easily upset						x				Calm, Stable
4E	Not assertive					x					Dominant
5F	Sober, Serious						x				Happy-go-lucky
6G	Expedient					x					Conscientious
7H	Shy, Timid								x		Venturesome
8I	Tough Minded					x					Tender minded
9L	Trusting				x						Suspicious
10M	Practical					x					Imaginative
11N	Forthright								x		Shrewd
12O	Self-assured									x	Apprehensive
13Q ₁	Conservative			x							Experimenting
14Q ₂	Group dependent			x							Self-sufficient
15Q ₃	Undisciplined									x	Self-disciplined
16Q ₄	Relaxed					x					Tense, Driven

Form C, which we used, contains 105 items which are designed as three alternative, multiple choice questions. An example taken from the instructions to Form C is (IPAT, 1969):

I prefer people who:

- a. are reserved
- b. (are) in between
- c. make friends quickly

The test items are organized such that about half get maximum score on a personality factor when responded to at the "a" alternative and half at the "c" alternative. Each item receives a score of 0, 1, or 2 (except intelligence, 0 or 1) depending on the participant's response.

There are 6 to 8 items on each of the 16 Personality Factors which the questionnaire purports to measure. The score on each item contributes to only one primary factor. The raw score on any factor is the sum of the item scores. Either raw scores or standard scores (STEN) may be used for research purposes. The standard scores are commonly used also for individual assessments and counseling.

The 16 PF (Form C) contains a scale referred to as the Motivational Distortion Scale (MD). Distortion, when it occurs, often appears as responses which are more socially desirable in the view of the respondent than how he actually sees himself. Cattell, et al. (1970) point out that if everyone distorted equally, the only control necessary would be to develop a distinct set of norms for different test taking situations. Unfortunately, each person approaches any test with a unique set of needs and attitudes. Thus many personality tests employ distortion, faking, or lie scales to try to screen out some of these problems. The range of MD raw scores on the 16 PF is theoretically from 0 to 14. A sten of 5.5 (the average for the sten range) would correspond to a raw MD score of 7.5.

It was decided to use a raw score of 11 (corresponds to a sten of 8) as the cutoff for screening motivational distortion. Those individuals who scored 11 or higher were classified as distorters and removed from many of the subsequent analyses. The percentage of motivational distortion was relatively consistent across bases except for the Top Camps whose small numbers make any conclusions very tentative. See Table 8.

In order to describe the "typical" airman assigned to isolated and control bases, the average scores for each of the 16 Personality Factors were plotted on a standard profile as employed by Cattell et al. (1970). The isolated base composite was plotted on the same sheet as that for the control bases (Figure 1). There was very little difference between

TABLE 8

16 PF Sample with Motivational Distortion Scores Listed

		Frequency of Scores		% MD	Total
		MD(11+)	MD(10-)		
0	Cape Lisburne	3	25	10.7	28
10	Cape Lisburne Top Camp	1	4	20.0	5
1	Shemya	8	75	9.6	83
3	Elmendorf	11	97	10.2	108
4	Eielson	10	72	12.2	82
5	Murphy Dome	7	54	11.5	61
6	Tatalina	3	28	10.3	31
16	Tatalina Top Camp	0	4	0	4
7	Cape Newenham	4	32	11.1	36
17	Cape Newenham Top Camp	1	4	20.0	5
8	Fort Yukon	8	50	13.8	58
		<hr/>	<hr/>	<hr/>	<hr/>
		56	445		501

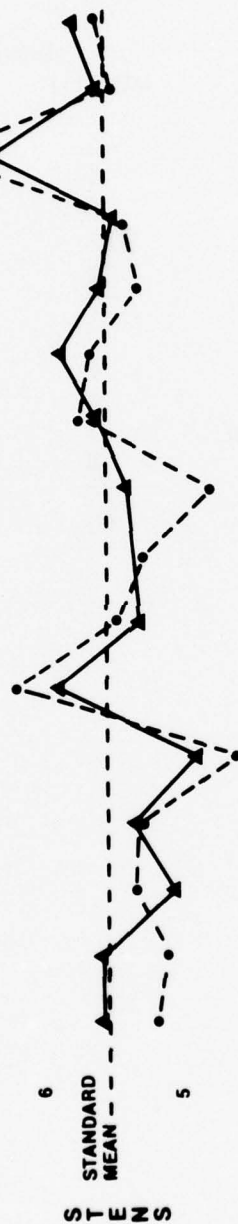
Figure 1.

SIXTEEN PF PERSONALITY PROFILES FOR
AIR FORCE PERSONNEL ASSIGNED TO ALASKA

PERSONALITY FACTORS

A B C E F G H I L M N O Q₁ Q₂ Q₃ Q₄

7



4

--- CONTROL BASES

MEANS	5.15	5.07	5.30	5.27	4.54	6.17	5.43	5.24	4.75	5.70	5.61	5.25	5.37	6.72	5.49	5.54
σ	2.12	1.81	2.12	2.05	2.01	1.75	2.19	1.72	1.94	2.14	2.02	1.92	1.99	1.81	1.74	1.85

--- ISOLATED BASES

MEANS	5.53	5.57	5.08	5.29	4.83	5.88	5.25	5.28	5.33	5.55	5.84	5.51	5.46	6.36	5.99	5.73
σ	2.29	1.81	2.01	2.10	1.89	1.65	2.14	1.70	2.00	1.93	1.74	1.80	2.05	1.99	1.68	2.04

these groups; only two factors seemed to be far enough apart to warrant statistical testing. These were Factor A (Reserved — Outgoing) and Factor L (Trusting — Suspicious).

While the difference on Factor A was not statistically significant (2), the difference on Factor L did reach significance (3). Those on isolated duty were less trusting than those on major bases. Their scores approach the average for the norm group and therefore they can not be viewed as being overly suspicious, but simply less trusting than the control groups. The isolated sample is more similar on this dimension to military groups reported on in Cattell et al. (1970) than is the control sample.

In addition to looking at statistical differences between groups on specific scales, another technique has been offered by the test authors (Cattell et al., 1970). This involves the matching of profiles as units and has some logical support from the emphasis that many theorists and clinicians place on comparisons based on the whole man or the entire personality spectrum. The statistic employed is called the profile similarity coefficient or r_p . It involves the sum of the squared deviations between two profiles which are weighed, based on empirically derived tables provided by the authors. The coefficient has a range from -1 to 1 and is generally interpretable as a correlation.

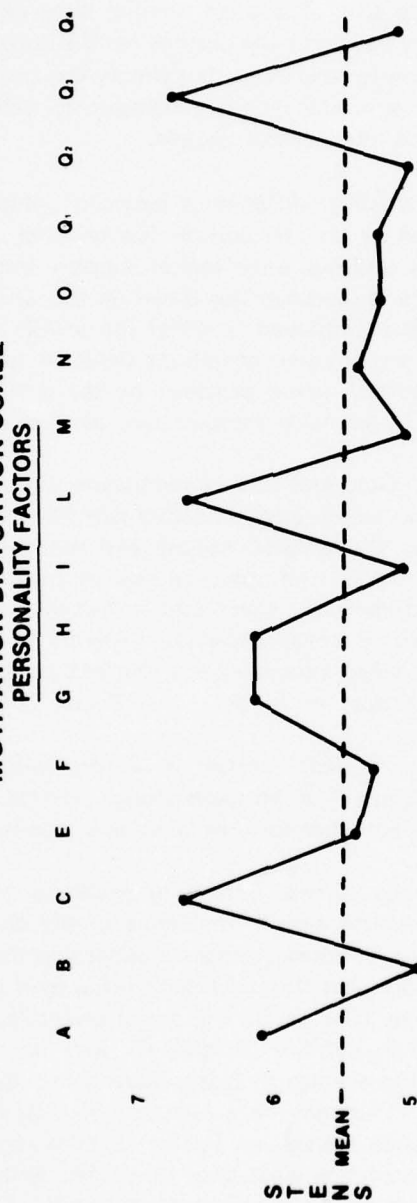
The similarity between the isolated and control composite was verified by the profile similarity coefficient $r_p = 0.917$, which is significantly different from zero. This is in contrast to $r_p = 0.634$ between the isolated sample and the motivational distortion group, and $r_p = 0.603$ between the control group and the motivational distortion group, both of which also represent statistically significant relationships. So although the motivational distortion group provided a profile that was different from the isolated sample and control samples in some ways when examined as a whole, these participants had much in common with the "typical" airman in Alaska. See Figure 2.

A narrative description of a "typical" airman in Alaska follows. The reader will want to look at the profile in Figure 1 as he reads along. Unless otherwise stated, no attempt will be made to discriminate between isolated and non-isolated groups.

The personality profile of the typical airman in Alaska is noteworthy from the standpoint of its overall average nature despite the rigors of the environment. There is really no indication of what might be considered psychological pathology, either induced by the living conditions or based on what the individuals bring with them to the situation. The men are of average intelligence (Factor B) and social orientation (Factor A). They seem to be average in emotional stability (Factor C) and are not overly assertive (Factor E). They diverge from the average in being more sober and serious (Factor F) than the standardization sample. This may be a function of their life style and mission orientation. They are slightly above average on Factor G, consciousness, indicating that they see themselves as willing to complete what they start. The airmen are about average in terms of inhibition and personal sensitivity (Factors H and I). Those at control bases

Figure 2.

SIXTEEN PF PERSONALITY PROFILE FOR 56
AIR FORCE PERSONNEL CLASSIFIED BY THE
MOTIVATION DISTORTION SCALE



MEAN	6.09	4.98	6.70	4.96	5.29	6.16	6.16	5.04	6.68	5.02	5.4	6.23	6.27	5.02	6.77	5.11
SD	2.01	1.55	1.92	2.04	1.59	1.88	1.93	1.50	1.96	1.97	1.5	1.79	1.86	1.54	1.85	1.94

are significantly more trusting and less suspicious than those at isolated bases, who approach the average (Factor L). Men at both types of bases are average in their use of imagination and fantasy (Factor M). They are not overly apprehensive or anxious (Factor O) which is a sign that they are coping well with the environment and do not feel overly stressed to the extent that situational changes are indicated in their profiles. They do not perceive themselves as particularly shrewd, deep thinkers (Factor N), and they take the middle ground on the conservative-liberal continuum (Factor Q₁). Factor Q₂ demonstrates that airmen in Alaska see themselves as self sufficient and resourceful, preferring their own decisions to being followers. Many of the men in the sample were either non-commissioned officers or probably aspired to that status. The high score on this dimension is comparable to that reported by Cattell, et al. (1970) for Air Force cadets. The airmen were also average in terms of self control (Factor Q₃) and also in terms of general tension level (Factor Q₄).

Summary of Typical Airmen: The general picture is of men who are, on the average, normal people. They see themselves as responsible, serious and self sufficient individuals. These characteristics could be ideal for performance in their current job status. There are several cautionary notes, however. We have been discussing the "typical" or "average" airman in Alaska. Anyone who has ever dealt with descriptive statistics knows that the average is a best guess estimate to describe a group of numbers on some continuum. There is virtually always variability around this estimate. The range on every one of the 16 Factors in the 16 PF ran the gamut of Sten 1 to Sten 10, which means that there are individuals who are better qualified than the average to live and work in the Alaskan environment, and there are also those who are not well adapted.

Analysis of 16PF Data Across Locations: One-way analyses of variance were conducted on each of the 16 personality factors and also on 8 second order factors, which the test is supposed to measure. Since the 16 PF requires completion of all items, the degrees of freedom for every test were the same: 7 and 425. Out of 23 analyses of variance only 4 provided significant variability. Each will be discussed in turn along with the results of post hoc testing, which demonstrated between which locations differences actually existed. The existence of these differences does not follow a logical pattern related to our hypothesis about the nature of isolated duty.

Factor I represents a continuum ranging from self-reliance (low sten score) to dependence (high sten score). Judging from the pooled profiles that were discussed earlier, the average airman in Alaska leans toward self-reliance in his test responses. Those highest in dependency are barely over the mean for the standardization sample. So what we are really discussing are varying degrees of self-reliance. All the significant variability was between isolated bases (4). Post hoc testing using the Newman-Keuls analysis indicated that those men at Cape Newenham saw themselves as significantly more self-reliant than did men at Tatalina and Cape Lisburne (Table 9).

TABLE 9^a

Results of Newman-Keuls Analysis on
Factor I (Self Reliant (Low Sten) — Dependent (High Sten))

Location Code	7	4	1	5	3	8	0	6
Means	4.656	5.028	5.093	5.167	5.392	5.40	5.72	5.857
7								
4			.437	.511	.736	.744	1.064*	1.20*
1		.065	.065	.139	.364	.372	.692	.829
5				.074	.299	.307	.627	.764
3					.225	.233	.553	.69
8						.008	.328	.465
0							.320	.457
6								.137

Schematic Presentation of Differences^b

7 4 1 5 3 8 0 6

0 Cape Lisburne
1 Shemya
3 Elmendorf
4 Etelson
5 Murphy-Dome
6 Tatalina
7 Cape Newenham
8 Ft. Yukon

^aSee Appendix for explanation of statistical terms^bLocations sharing common underlining do not differ significantly

Factor L provides a continuum from trusting (low sten score) to suspicious (high sten score). Many airmen in Alaska reported that they were on the trusting end of the continuum with those at control bases being somewhat more trusting and less suspicious. The analysis of variance and post hoc testing indicated that the primary source of differences between isolated and control groups on Factor L actually represented a difference between Elmendorf AFB and Murphy Dome and Ft. Yukon AF stations (5). (See Table 10). Eielson AFB — the other control base — was not significantly different from any other base on Factor L.

Factor M ranges from practical (low sten) to imaginative (high sten). The concept of imagination refers to an individual's reported use of fantasy. The airmen in Alaska are about average relative to the standardization sample. However, there were some differences across locations (6). Most of these were accounted for based on a relatively high mean score for men at Tatalina who reported themselves as well above the men at Shemya, Ft. Yukon, Eielson and Cape Newenham in what amounts to the use of fantasy in everyday life (Table 11).

Part of the reason that Tatalina seems to stand out on Factors I and M may be explained in part by the results on the second order Factor Q_{IV} , subdued (low sten) — independent (high sten). Second order factors are computed on more items than the 16 source trait factors and contain variability from other factors. As will be seen in Table 12, the men at Tatalina see themselves as more independent than the men do at Shemya, Cape Newenham, and Eielson (7). It is possible that when we tested at Tatalina there was a unique group of men there, who differed on three 16 PF scales from at least some of their co-workers at other isolated bases.

Human beings are very plastic organisms; adaptable to a wide variety of conditions, in many cases without exhibiting vast personality changes which may be expressed, in simple terms, as abnormal behavior. This result is in agreement with that of Taylor (1969), who examined Scott Base personnel in Antarctica using a test-retest paradigm rather than the control group design employed by us. Taylor (1969) found that personnel did not change significantly over their tours of isolation.

The results of the 16 PF also are in agreement with formal and informal interviews that we conducted at isolated bases. Many reported that they adopted a coping strategy, realized that they had a year's tour, and took things one day at a time. Each of the professional psychologists that went to Alaska could cite individual instances of men not functioning well, but in most cases coping was a way of life. There were even a few people who enjoyed the isolated situation.

Food Aversions: Additional evidence of the adaptation and coping success of airmen on isolated assignments comes from the food preference survey. Participants were given

TABLE 10

Factor L (Trusting (Low Sten) — Suspicious (High Sten))

Location Code	3	0	1	4	6	7	5	8
Means	4.495	4.84	4.853	5.083	5.286	5.312	5.778	5.880
3		.345	.358	.588	.791	.817	1.28*	1.385*
0			.013	.243	.446	.472	.932	1.04
1				.23	.433	.459	.925	1.02
4					.203	.229	.695	.797
6						.026	.492	.594
7							.466	.568
5								.102
8								

Schematic Presentation of Differences*

3	0	1	4	6	7	5	8
---	---	---	---	---	---	---	---

* Locations Sharing Common Underlining
do not differ significantly

TABLE 11

Factor M (Practical (Low Sten) – Imaginative (High Sten))

Location Code	8	1	7	4	5	3	0	6
Means	5.040	5.080	5.25	5.278	5.963	6.01	6.08	6.679
8		.04	.21	.238	.923	.97	1.04	1.639 *
1			.17	.198	.883	.93	1.0	1.599 *
7				.028	.713	.76	.83	1.429 *
4					.685	.732	.802	1.40
5						.047	.117	.716
3							.070	.669
0								.599
6								

Schematic Presentation of Differences*

8 1 7 4 5 3 0 6

*Locations Sharing Common Underlining
do not differ significantly

TABLE 12
Factor Q_{IV} Subdued (Low Sten) – Independent (High Sten))

Location Code	1	7	4	8	3	0	5	6
Means	4.921	5.072	5.150	5.390	5.709	5.736	5.798	6.246
1		.151	.229	.469	.788	.815	.877	1.325 *
7			.078	.318	.637	.664	.726	1.174 *
4				.24	.559	.586	.648	1.096 *
8					.319	.346	.408	.855
3						.027	.089	.537
0							.062	.51
5								.448
6								

Schematic Presentation of Differences*

1 7 4 8 3 0 5 6

*Locations Sharing Common Underlining
do not differ significantly

the opportunity to respond to each food by noting that they had never tried it. There is some marginal evidence that the number of foods an individual will not eat is related to certain aspects of his personality. Wallen (1945)⁴⁰ compared groups he referred to as "neurotics", who were being discharged prematurely from the Marine Corp, with other groups which were supposedly normal. They were told to indicate which foods they disliked to the point that they would refuse to eat them on a 20-item food list. The mean number of food aversions for two neurotic groups was 3.96 and 4.11. However, the means for two normal groups were 0.99 and 1.28, respectively. Gough (1946)⁴¹ had similar results with means of 5.14 and 1.23 for neurotic and normal groups respectively. Smith, Powell and Ross (1955)⁴² found a mild positive relationship between food aversions and Taylor Manifest Anxiety scores.

There were 98 foods (plus two control foods) which were in the food preference survey administered in Alaska. Frequencies were completed for each individual on the foods he rated as "disliked" on the low end of the 9 point hedonic scale. Specifically, the number of ratings using scale values of "1" or "2" that an individual assigned were counted. The data developed from our 98 item questionnaire were not directly comparable to the numbers produced by Miller (1945) and Hough (1946) who used only a 20-item list. Average food aversions were computed by dividing the total frequency of food aversions at a base by the number of respondents at that base. The average was made comparable to one achieved with a 20-item food list by multiplying it by a factor of 0.204, which is 20 divided by 98. The results of these computations are shown in Table 13. The averages are below those attributed to the neurotic sample by previous investigators, indicative that to the extent that food aversions demonstrate personality problems, we again find that airmen in Alaska are coping well.

Food Preference Questionnaire:

Factor Analysis: The Food Preference Questionnaire consisted of 100 items, each providing for one of two responses. If the respondent indicated he had never tried the food, then he was finished with that item and could go on to the next. If he had tried the item,

⁴⁰Wallen, R. Food aversions of normal and neurotic males. *Journal of Abnormal Social Psychology*, 1945, **40**, 77-81.

⁴¹Gough, H. G. An additional study of food aversions. *Journal of Abnormal Social Psychology*, 1946, **41**, 310-312.

⁴²Smith, W., Powell, E. and Ross, S. Manifest anxiety and food aversions. *Journal of Abnormal Social Psychology*, 1955, **50**, 101-104.

TABLE 13

Food Dislikes at Alaskan Isolated Bases

Location	Total No. of Scale Values 1&2 Assigned	Number of Respondents	Average No. of Food Dislikes	Adjusted Average ¹
Shemya	705	90	7.83	1.597
Cape Newenham	308	41	7.51	1.532
Elmendorf	1131	108	10.47	2.136
Tatalina	314	39	8.05	1.642
Fort Yukon	471	57	8.26	1.685
Murphy Dome	495	62	7.98	1.628
Eielson	760	83	9.15	1.867
Cape Lisburne	172	34	5.06	1.032

¹Computation based on same premise as that in the previous table.

he rated his liking or disliking on a nine-point scale and then indicated whether he preferred that food on isolated duty, off isolated duty, or whether it made no difference to him.

The first phase of data analysis was concerned with the basic psychometric structure of the questionnaire. Did respondents deal with each item independently of the rest or did they rate items from the standpoint of some internal system? Did they respond randomly or straight line the rating in blocks (i.e., for items in a row) or for the entire questionnaire? These questions were vital to the ultimate interpretation of the responses. To resolve them, factor analyses of the data were undertaken.

The first analysis was done on the entire sample of 514 questionnaires, including every one surveyed in Alaska. As previously described in the section dealing with the 16 PF, factor analysis is a technique for finding clusters of relationships between variables. If people consistently rate a group of foods in a similar manner, then these foods will appear, or load, on a factor, or cluster. If respondents had straight lined their responses, such as giving all 2's, 3's, or 4's, for example, then all ratings would have loaded on one factor. This fortunately did not occur. If they had straight lined in blocks, then the foods would have loaded on factors which made no logical sense, since the factors would have depended primarily on the order of the food items in the questionnaire. This did not occur either.

What did happen was that most of the variability in ratings was item specific. Both isolated and control respondents rated most food items independently, and the items did not load on any factor. The clustering that did occur was along logical lines. When people rate they attend to certain attributes or physical characteristics of the objects rated, or in this specific case, those attributes that they associated with the food names. An examination of Table 14 indicates some of the possible attributes that the Air Force personnel in Alaska employed. In Factor 1 they seemed to attend to sweet high-preference items. In Factor 2 they rated in similar fashion those items which are not frequently served and tend to have low hedonic ratings. Factor 3 was simply a reliability estimator based on an item which appeared twice in the survey. Both items that loaded on it were identical: fresh oranges. Those two items provided an intercorrelation of $r = 0.892$ which indicated that most respondents were attending well to the items in the questionnaire. Most of the factors were self-explanatory based on their contents. Factor 8 may be a food class cluster, however, where respondents tend to deal with some vegetables as a group.

TABLE 14

**Factor Analysis of Food Preference Scores
for the Entire Alaskan Sample**

FACTOR 1 SWEET ITEMS – PRIMARILY DESSERTS		
FOOD	LOADING	FOOD CLASS
Brownies	.573	Dessert
Yellow Cake	.620	Dessert
Doughnuts	.632	Breakfast Item
Chocolate Milk	.578	Beverage
Chocolate Cake	.710	Dessert
FACTOR 2 EXOTIC AND/OR LOW PREFERENCE ITEMS		
Creamed Onions	.570	Vegetables
Pork Chop Suey	.509	Stews & Casseroles
Three Bean Salad	.521	Salad
Shrimp Creole	.505	Stews & Casseroles
Sweet & Sour Pork	.608	Entree-Meat
FACTOR 3 FRUIT – ORANGES		
<i>Fresh Oranges*</i>	.852	Fruit
Fresh Oranges	.867	Fruit
FACTOR 4 PORK		
Roast Pork	.677	Entree-Meat
Pork Chops	.747	Entree-Meat
FACTOR 6 MEXICAN ITEMS		
Enchiladas	.738	Stew & Casseroles
Tacos	.723	Short Order
FACTOR 7 CHICKEN		
Barbecued Chicken	.663	Entree-Meat
Fried Chicken	.630	Entree-Meat
FACTOR 8 VEGETABLES		
Peas & Carrots	.794	Vegetables
Green Beans	.496	Vegetables
FACTOR 9 STEAK		
Salisbury Steak	.685	Entree-Meat
Swiss Steak	.641	Entree-Meat

*Note that this item was included twice in the questionnaire as an indicator of reliability

TABLE 14 (cont'd)

**Factor Analysis of Food Preference Scores
for the Entire Alaskan Sample (cont'd)**

FACTOR 12		TOMATO ITEMS	
FOOD	LOADING	FOOD CLASS	
Tomato Juice	.514	<i>Beverage</i>	
Stewed Tomatoes	.603	Vegetables	
FACTOR 17		CONTROL FOOD	
Braized Trake	.747	Nonexistent	

All other items loaded on either no factors, or they established a factor of their own with no other foods rated the same way. The control food "braized trake" loaded on its own factor. The primary response to it was "never tried" which is a further indication of instrument validity.

A factor analysis of food preference ratings for personnel at isolated duty stations also yielded a factor structure which was logical in nature. It produced more factors with more items loading on some factors (Table 15). It will be noted that the isolated groups generated the following factors which were in common with those from the whole sample: Sweet items, exotic and/or low preference items, vegetables, Mexican items, chicken, steak, pork, and fruit-oranges.

In addition, the isolated subsample produced the following factors: beef; melons; potatoes; and Italian, cheese, casseroles. This latter factor is a complicated one. Respondents may have attended to the cheese aspects of the cheeseburger in rating it similarly to the other elements loading on that factor. These foods also had in common relatively high hedonic ratings.

The control sample data was analyzed in a somewhat different manner. Only those variables or foods that appeared in factors on the previous two analyses were included. This was done to increase the ratio of participants to variables (191 to 45 rather than 191 to 100), the original ratio was considered statistically inadequate.

TABLE 15

Factor Analysis of Food Preference Scores
for the Isolated Bases

FACTOR 1 SWEET ITEMS – PRIMARILY DESSERTS/BREAKFAST ITEMS

FOOD	LOADING	FOOD CLASS
Waffles	.524	Breakfast Item
Brownies	.527	Dessert
French Toast	.558	Breakfast Item
Yellow Cake	.624	Dessert
Doughnuts	.715	Breakfast Item
Chocolate Milk	.588	Beverage
Chocolate Cake	.611	Dessert

FACTOR 2 EXOTIC AND/OR LOW PREFERENCE ITEMS

Creamed Onions	.606	Vegetables
Pork Chop Suey	.580	Casserole
Three Bean Salad	.544	Salad
Shrimp Creole	.517	Entree-Seafood
Spanish Omelet	.585	Breakfast Item
Chicken Cacciatore	.595	Entree-Meat
Sweet & Sour Pork	.612	Entree-Meat
Buttered Zucchini Squash	.523	Vegetables

FACTOR 3 VEGETABLES

Peas & Carrots	.787	Vegetables
Mixed Vegetables	.689	Vegetables
Green Beans	.630	Vegetables
Peas	.774	Vegetables

FACTOR 5 PORK ITEMS – HIGH PREFERENCE

Roast Pork	.724	Entree-Meat
Baked Ham	.605	Entree-Meat
Pork Chops	.731	Entree-Meat

FACTOR 6 MEXICAN ITEMS

Enchiladas	.719	Casseroles
Tacos	.687	Short Order

FACTOR 7 FRUIT

Fresh Apples	.515	Fruit
Fresh Oranges	.825	Fruit
Fresh Oranges	.854	Fruit

TABLE 15 (cont'd)

Factor Analysis of Food Preference Scores
for the Isolated Bases

FACTOR 8		BEEF	
FOOD	LOADING		FOOD CLASS
Roast Beef w/Gravy	-.522		Entree
Grilled Steak	-.678		Entree
FACTOR 9		MELONS	
Cantalope	-.679		Fruit
Honeydew Melon	-.582		Fruit
FACTOR 11		POTATOES	
Mashed Potatoes	-.553		Starch
Baked Potatoes	-.612		Starch
FACTOR 12		CHICKEN	
Barbecued Chicken	.736		Entree-Meat
Fried Chicken	.673		Entree-Meat
FACTOR 16		STEAK	
Salisbury Steak	.714		Meats
Swiss Steak	.597		Meats
FACTOR 23		ITALIAN & CHEESE & CASSEROLES	
Cheeseburger	-.573		Shortorder
Macaroni & Cheese	-.570		Casserole
Spaghetti & Meat			
Sauce	-.519		Casserole
Lasagna	-.573		Casserole
Pizza	-.562		Shortorder

The data collected at the two control bases generated 11 factors compared to the 12 produced by the isolated respondents (Table 16). Eight factors were similar to the isolated groups and three were not. The common factors included sweets, exotic and/or low preference, vegetables, pork, Mexican, fruit, chicken and steak items. Unique factors relative to the isolated group were tomato items, breakfast items, and an unnamed factor. The latter was unnamed because its two components, lasagna and grilled steak did not seem to have much in common. An examination of foods loading on the 2nd factor of this analysis (exotic and/or low preference) indicated a loading by braised trake, a nonexistent food. This was a troublesome result because its appearance calls into question the response accuracy of the participants in the control sample. When all Alaska data were pooled, braised trake loaded on its own factor and it loaded on no factors in the isolated sample. Many of the control participants must have read braised trake as a real food; and not having tasted it recently, they assigned it a low preference rating along with some of the other disliked foods.

TABLE 16

Factor Analysis — Control
Group — Eielson + Elmendorf

FACTOR 1 SWEET ITEMS — PRIMARILY DESSERTS		
FOOD	LOADING	FOOD CLASS
Brownies	.501	Dessert
Yellow Cake	.669	Dessert
Doughnuts	.520	Breakfast
Chocolate Milk	.513	Beverage
Chocolate Cake	.858	Dessert
FACTOR 2 EXOTIC AND/OR LOW PREFERENCE ITEMS		
Creamed Onions	-.628	Vegetables
Three Bean Salad	-.562	Salad
Shrimp Creole	-.521	Entree-Seafood
Buttered Zucchini Sq.	-.506	Vegetables
Braised Trake	-.493	Fictional
FACTOR 3 FRUIT		
Fresh Apples	.599	Fruit
Fresh Oranges	.849	Fruit
Fresh Oranges	.883	Fruit
FACTOR 4 MEXICAN		
Enchiladas	-.754	Casserole
Tacos	-.816	Shortorder

TABLE 16 (cont'd)

Factor Analysis — Control
Group — Eielson + Elmendcrf (cont'd)

FACTOR 5	MEXICAN	
FOOD	LOADING	FOOD CLASS
Peas & Carrots	.797	Vegetables
Mixed Vegetables	.761	Vegetables
Peas	.664	Vegetables
FACTOR 6	PORK	
Roast Pork	.586	Entree-Meat
Pork Chop	.678	Entree-Meat
FACTOR 7	STEAK	
Salisbury Steak	.639	Entree-Meat
Swiss Steak	.670	Entree-Meat
FACTOR 8	CHICKEN	
Barbecued Chicken	.698	Entree-Meat
Fried Chicken	.679	Entree-Meat
FACTOR 9	TOMATO	
Tomato Juice	.520	Beverage
Stewed Tomatoes	.612	Vegetable
FACTOR 10	BREAKFAST ITEMS	
Waffles	.648	Breakfast
French Toast	.539	Breakfast
FACTOR 11	UNNAMED	
Lasagna	.603	Casserole
Grilled Steak	.567	Entree-Meat

In order to determine whether this factor structure of the questionnaire was typical for Alaska, an additional analysis was done. Data were available from a large sample of personnel, 1557, who responded to a food preference questionnaire at Air Force bases in the Continental United States (Waterman, Meiselman, Reed, Symington, and Branch, 1974).^{4,3} The questionnaire employed in that study included 379 items in comparison to the 100 items we used in Alaska. However, from the 100-item instrument, 79 foods were common to those in the previous research. The food preferences on these 79 foods from the 1557 respondents were factor analyzed using the same program employed on the previous analyses. Eight rotated factors which contained two or more significant loadings were generated (Table 17). Those factors which were in common with all the Alaskan groups included: exotic/low preference, vegetables, Mexican, pork, and fruit. In addition, there were three factors which did not match any Alaskan group: Soft foods, meats, and an unnamed factor. **Significant by its absence in the mainland sample was the cluster referred to as the sweets factor in the Alaskan sample.** Also absent were chicken, steak, and tomato items. Table 18 presents a summary of the factor structures described in all these analyses.

TABLE 17

Factor Analysis Air Force 1557 Cases

FACTOR 2 EXOTIC AND/OR DISLIKED		
FOOD	LOADING	FOOD CLASS
Creamed Onions	.584	Vegetables
Chicken Caccitore	.575	Entree-Meat
Sweet & Sour Pork	.570	Entree-Meat
FACTOR 3 ORANGE		
Orange Juice	.586	Beverage
Fresh Oranges	.690	Fruit
Fresh Oranges	.705	Fruit

^{4,3}Waterman, D., Meiselman, H., Reed, T., Symington, L., and Branch, L. *Food Preferences of Air Force Enlisted Personnel*. (TR 75-51-FSL) Food Sciences Laboratory, United States Army Natick Laboratories, Aug 1974.

TABLE 17

Factor Analysis Air Force 1557 Cases (cont'd)

FACTOR 4		VEGETABLES	
FOOD	LOADING		FOOD CLASS
Lima Beans	.516		Vegetables
Peas & Carrots	.594		Vegetables
Mixed Vegetables	.612		Vegetables
Peas	.582		Vegetables
FACTOR 6		MEXICAN FOODS	
Enchiladas	.676		Casserole
Tacos	.693		Short Order
FACTOR 7		SOFT FOODS	
Mashed Potatoes	.509		Starch
Pumpkin Pie	.501		Dessert
Baked Potatoes	.490		Starch
FACTOR 8		MEATS (Foreign Names)	
Swiss Steak	.612		Entree-Meat
Swedish Meatballs	.700		Entree-Meat
FACTOR 9		PORK	
Roast Pork	.625		Entree-Meat
Sweet & Sour Pork	.679		Entree-Meat
FACTOR 14		UNNAMED	
Shrimp Creole	.521		Entree-Seafood
Candied Sweet Potatoes	.702		Starch

TABLE 18

**Summary of Factor Structure: A List
Of Derived Factor Names**

GROUP			
Isolated	Control	Entire Alaskan Sample	Mainland Air Force Sample
Sweets	Sweets	Sweets	
Exotic/Low Pref	Exotic/Low Pref	Exotic/Low Pref	Exotic/Low Pref
Vegetables	Vegetables	Vegetables	Vegetables
Pork	Pork	Pork	Pork
Mexican	Mexican	Mexican	Mexican
Fruit	Fruit	Fruit	Fruit
Beef			
Melon			
Potatoes			
Chicken	Chicken	Chicken	
Steak	Steak	Steak	
Italian/Cheese/ Casseroles			
	Tomato Items	Tomato Items	
	Breakfast Items		
	Unnamed		
		Braised Trake	
			Soft Foods
			Meats
			Unnamed

The Alaskan groups appear to have more in common with each other than they have with mainland personnel rating the same foods. A technical reason why this may have occurred is based on the difference between the questionnaires used in Alaska and in the mainland study of Waterman et al. (1974). The longer 379 item instrument would have presented the food names in a different perceptual context, and there would have been varied fatigue effects because it takes longer to respond to 379 items. Assuming that the difference between the Alaskan sample and that on the mainland could have been a measurement artifact, what alternative explanations are there?

Although this is speculative, one might feel that the more articulated factor structures generated in Alaska were indicative of something. **Could personnel in Alaska, both isolated and control groups, be more food oriented leading to an increased organization of food preferences?** Food may become more stereotyped, in that Alaskan personnel respond to it (or its names) in groups according to preferences whereas men on the mainland attend to foods more as individual items and produce a factor structure with more unaccountable variability. It must be emphasized that this is strictly conjecture and should be taken as such.

Using the food classification system of Waterman et al. (1974) it will be noted that foods do not tend to cluster by class (see Tables 14-17). Only vegetables seem to group nicely this way. The factor structure of the questionnaires is a description of how people look at and respond to food labels. There are overriding attributes which may cause stated food preference to cluster. Ethnic specialties may provide some cognitive groupings of food irrespective of class. In other cases, it may simply be a physical similarity of the food names. Although Salisbury steak and Swiss steak are both within the meat class, it is equally probable that they loaded on the same factor because of the common word steak which is generally a high preference item. The pork items which are also in the meat class load on a factor of their own.

The absence of the sweets factor in the large mainland sample also provides some interesting material for speculation. Again, assuming that this is something more than measurement artifact, one might examine the possible alternatives. Are Alaskan personnel more oriented on the sweet foods because of their high caloric content? This seems unlikely because they already receive an Arctic diet of 4800 calories per day, which in many cases is more than they need unless engaged in physical labor out-of-doors. Does the orientation on sweets have any relationship to the conditions of Alaska at the beginning of winter when the data were collected? This also seems unlikely because, on the average, personnel reported themselves to be well adjusted on the 16PF Questionnaire.

Analysis of Food Preferences Across Locations: Analyses of food preference variables were done across the locations sampled for each food in the questionnaire. These analyses were done twice: once including only locations from Alaska, and the second time employing an additional data source which we will call Air Force Sample 1 (AF-1). The latter group was a subset of data collected from Air Force bases in the Continental United States and reported in Waterman et al. (1974). Since there were 1557 respondents it was decided to sample a subset of the data base by entering the data file randomly and stepping to every 15th record. AF-1 consisted of 102 records, which was a sample size more in line with that collected in Alaska. It should be noted that only 79 foods could be matched between the current food preference questionnaire and that employed previously on the mainland.

Table 19 presents the analyses of variance (ANOVA) and Newman-Keuls analyses which were significant in one way or another.

We decided to only examine further those foods which reached the $P < 0.01$ level of significance on the ANOVA and had concurrent Newman-Keuls values which demonstrated at least one between location significant difference ($P < 0.05$). The drop in significance level for the Newman-Keuls was done to make it easier to separate the locations. Only 16 foods met these criteria. This conservative approach was necessary for several reasons. First, because we had done so many analyses of variance, the probabilities of significance by chance were increasing as more and more tests were done. Secondly, it was desirable to keep the analyses, which were designated for further interpretation, as simple as possible and as few as could be consistent with the overall design.

Before examining the 16 foods which met the criteria for further analyses, one might ask what effect the addition of AF-1 had on the analysis. An examination of Table 19 indicates that for 11 foods it enhanced the variability, thereby increasing the significance level. These foods were: 1) salisbury steak, 2) mashed potatoes, 3) french dressing, 4) stewed tomatoes, 5) spanish rice, 6) fried chicken, 7) coffee, 8) baked ham, 9) grilled steak, 10) peas, 11) buttered zucchini squash. In three cases the addition of AF-1 reduced the variability indicating that for those foods the responses from the mainland sample covaried with those of the Alaska groups. These foods were: 1) Boston baked beans, 2) spinach, 3) low cal soda. On the remainder of the food variables (86) there was no difference between the analyses which included AF-1 and those which did not.

Table 20 presents an arbitrary coding system which we have used to indicate locations where data were collected. Reference back to Table 20 will be necessary if any of the differences reported between locations is important to the individual reader. Table 21 lists the foods that were found to show differences in the average preference ratings.

Although there were no systematic isolated vs. control differences, a few summary statements are in order. Mashed potatoes and corn-on-the-cob seemed to be more highly rated by CONUS personnel than those in Alaska. In contrast, for grilled steak and pizza, which are usually rated well, the mainland group had lower preference ratings, although they still indicated a preference for those items. Due to the shifting in ordinal relationship of locations across foods it would not be justified to make global statements about food preferences in specific Alaska locations. **There is some variability to be sure, but not enough consistent variability to warrant the employment of different menus across locations or from isolated to control bases.**

TABLE 19

Analyses of Variance Across Locations on Specific Food Variables

Food Name	df	Mainland Control Included			Newman-Keuls	df	Alaska Locations Only		
		F	SOA				F	SOA	Newman-Keuls
Salisbury steak	8, 598	2.11*	.027		-	7, 502	1.17	.016	-
Mashed potatoes	8, 604	4.49**	.056		+	7, 501	1.22	.017	-
Lima beans	8, 593	4.02**	.051		+	7, 497	4.49**	.060	+
Milk	8, 604	2.35*	.030		-	7, 501	2.57*	.035	-
French dressing	8, 595	2.75**	.036		-	7, 496	1.18	.016	-
Corn on the cob	8, 597	2.44*	.032		+	7, 498	2.00*	.027	+
Stewed tomatoes	8, 570	3.09**	.042		-	7, 483	2.40*	.034	-
Spaghetti & meat sauce	8, 601	3.05**	.039		+	7, 501	2.90**	.039	+
Spanish rice	8, 573	2.12*	.029		-	7, 486	1.69	.024	-
Fried chicken	8, 606	2.02*	.026		+	7, 504	1.84	.025	+
Peach pie	8, 580	2.24*	.030		-	7, 485	2.42*	.034	-
Meat loaf	8, 602	5.34**	.066		+	7, 502	6.03**	.078	+
Roast pork	8, 601	1.57	.020		+	7, 502	1.76	.024	+
Cole slaw	8, 599	2.57**	.033		+	7, 498	2.94**	.040	+
Boston baked beans	8, 560	2.46*	.034		-	7, 468	2.86**	.041	-
Coffee	8, 593	2.70**	.035		+	7, 496	2.30*	.031	+
Spinach	8, 583	1.92	.026		+	7, 487	2.14*	.030	+
Baked ham	8, 605	2.23*	.029		-	7, 504	1.54	.021	-
Lasagna	8, 574	3.36**	.045		+	7, 492	3.74**	.050	+
Fried liver						7, 490	3.26**	.045	+
Low cal soda	8, 556	2.43*	.034		+	7, 476	2.81**	.040	+
Three bean salad						7, 382	2.95**	.051	-
Grilled steak	8, 605	3.35**	.042		+	7, 504	2.03*	.027	+
Pizza	8, 604	3.51**	.044		+	7, 501	3.12**	.042	+

TABLE 19

Analyses of Variance Across Locations on Specific Food Variables (cont'd)

Food Name	df	Mainland Control Included		df	Alaska Locations Only	
		F	SOA		F	Newman-Keuls
Grapefruit juice	8, 599	2.32*	.030	7, 499	2.49*	+
Spanish omelet				7, 408	4.42**	+
Pork chops				7, 503	2.79**	+
Sauerkraut				7, 478	3.42**	+
Roast turkey & gravy				7, 501	2.47*	+
Boiled cabbage				7, 485	3.03**	+
Green beans				7, 501	2.18*	+
Peas	8, 599	2.72**	.035	7, 500	1.47	-
Buttered Zucchini	8, 444	2.05*	.036	7, 398	1.79	+

60

* $p < .05$ ** $p < .01$

The Newman-Keuls test: Winer (1962) noted that the F statistic from the ANOVA is a more powerful test and that occasionally the Newman-Keuls and the F will disagree. You may get a significant F without being able to bring out between which locations the differences exist. Winer (1962) cautioned care in interpretation when the statistics disagreed. Note that in the table those Newman-Keuls tests which provided at least one significant difference are indicated with a "+".

⁴⁴Winer, B. J. *Statistical principles in experimental design*. New York: McGraw-Hill, 1962.

TABLE 20

**Results of Newman-Keuls Procedure:
Location Number Codes**

Base	Code
Control	
Elmendorf	3
Eielson	7
Air Force 1	9
Isolated	
Shemya	0
Cape Newenham	1
Tatalia	4
Ft. Yukon	5
Murphy Dome	6
Cape Lisburne	8

TABLE 21 *

Results of Newman-Keuls Procedure Differences
Across Locations on Specific Foods

Mashed Potatoes

Location	7	5	4	3	6	0	1	8	9
Means	5.75	5.89	5.90	6.04	6.08	6.27	6.59	6.61	7.21
Differences									

Lima Beans

Location	5	3	7	6	1	9	0	8	4
Means	3.82	4.21	4.22	4.48	4.88	5.0	5.31	5.53	5.54
Differences									

Corn On The Cob

Location	4	5	6	3	8	7	1	0	9
Means	6.33	6.87	7.23	7.27	7.35	7.36	7.37	7.37	7.6
Differences									

Spaghetti and Meat Sauce

Location	0	3	7	4	5	6	9	1	8
Means	6.24	6.57	6.58	6.59	7.07	7.10	7.15	7.32	7.53
Differences									

Meat Loaf

Location	0	3	5	9	4	6	1	7	8
Means	5.51	5.88	6.22	6.35	6.59	6.62	6.83	6.95	7.35
Differences									

*Note: How To Read These Tables:

The locations are rank ordered from left to right according to the magnitude for the average preference rating for each location. Those locations which differ significantly ($P < .05$) do not share common underlining. When they do share common underlining this means that they did not show a between location significant difference.

TABLE 21

**Results of Newman-Keuls Procedure Differences
Across Locations on Specific Foods (cont'd)**

Cole Slaw

Location	5	3	7	8	9	6	4	0	1
Means	5.15	5.65	5.75	5.97	6.06	6.16	6.45	6.48	6.51
Differences									

Coffee

Location	7	3	5	6	0	8	4	9	1
Means	5.24	5.64	5.89	5.92	6.14	6.18	6.26	6.57	7.13
Differences									

Lasagna

Location	0	7	3	4	9	6	5	1	8
Means	5.64	5.96	6.48	6.58	6.60	6.66	6.91	7.02	7.21
Differences									

Low Cal Soda

Location	6	3	7	5	9	1	4	0	8
Means	3.36	3.72	3.73	3.76	3.95	4.10	4.18	4.64	5.21
Differences									

Grilled Steak

Location	4	9	7	3	6	5	1	0	8
Means	7.66	7.66	8.07	8.10	8.19	8.24	8.29	8.39	8.59
Differences									

Pizza

Location	4	9	0	5	3	7	6	8	1
Means	6.56	6.96	7.17	7.38	7.51	7.54	7.60	7.94	8.0
Differences									

TABLE 21

**Results of Newman-Keuls Procedure Differences
Across Locations on Specific Foods (cont'd)**

Following Foods Have No AF-1 Match

Fried Liver

Location	4	5	3	1	7	6	0	8
Means	3.55	3.93	4.53	4.65	4.78	5.21	5.58	8.74
Differences								

Spanish Omelet

Location	7	3	5	0	4	6	1	8
Means	4.99	5.01	5.73	6.17	6.26	6.37	6.47	6.89
Differences								

Pork Chops

Location	5	6	3	4	1	7	0	8
Means	6.86	6.95	7.05	7.05	7.22	7.52	7.59	7.82
Differences								

Sauerkraut

Location	5	6	3	7	0	4	8	1
Means	4.48	5.0	5.05	5.10	5.53	5.92	5.94	6.67
Differences								

Boiled Cabbage

Location	5	3	6	7	8	4	0	1
Means	4.6	4.80	5.26	5.28	5.67	5.85	5.88	6.47
Differences								

It should be noted that the Strength of Associations (SOA) computed from the results of the analyses of variance (see Table 19) were uniformly low and well below the 0.10 cutoff which Linton and Gallo (1975)⁴⁵ have proposed. This meant the percentage of variability in the ANOVAS which could be explained by differences between locations was not great, relative to the total variability. The statistic used to compute the SOA's was the correlation ratio involving the simplest and most direct computation (divide the sum of squares for locations by the total sum of squares). It provides a rough estimate of the accountable variability. Based on the weak SOA's, it would not be unfounded to say that in general where a man is assigned does not tell you much about what foods he prefers. This was confirmed when foods were rank ordered by preference rating for isolated and control groups respectively. The Spearman Rho correlation was $Rho = 0.961$.

The foods rank ordered by preference rating are presented in the Appendix for the isolated and control samples, respectively. An examination of the ranks indicates that although agreement was not perfect there was substantial concordance in position of the 100 items listed. In only 18 items was there a rank difference of more than 10 rank positions.

Although the rank order of preferences for the 100 food names was very similar and we already knew that the differences between locations were not systematic, a curious finding occurs when one looks at the means of each food for the isolated and control groups, respectively. For 24 foods the average rating did not diverge between isolated and control groups by as much as one-tenth of a scale value point. However, in 86 foods the divergence was at least one-tenth of a point and generally more. One-tenth may not seem like much of a divergence and is admittedly an arbitrary selection of a criterion for a difference, but when scale values cluster the way they do, a divergence of one-tenth between means may be relevant.

The direction of these differences was also interesting. In 77 of the 86 foods where the difference exceeded one-tenth of a scale value, those in isolation had the higher preference rating. If one were to do a sign test this ratio of 77 (+)S to 9 (-)S would be significant ($P < .01$). It would appear that men in isolation report somewhat higher preferences for foods in general although their likes and dislikes are more or less in the same order as to those of men on control bases. This may mean that food in general is more important and, therefore more highly rated by men in isolation who are denied the same spectrum of alternatives that men have at main bases.

⁴⁵ Linton, M. & Gallo, P. S. The practical statistician: simplified handbook of statistics, Monterey: Brooks/Cole, 1975.

Another question which was asked in the food preference questionnaire was whether men preferred an individual food under specific conditions: "On isolated duty", "off isolated duty", or "no difference". In the majority of responses there was an indication that participants felt that their preferences were stable across situations, and that it made no difference whether they were isolated or not. The control group had 76.4% that said there was no difference in conditions, while the isolated group had a very comparable 78.1%. These percentages were based on the average number of individuals responding across the food names and the average number of "No difference" responses. There was some slight variability across foods but the predominant answer to the question was clearly "No difference". This may have been in part a psychometric failure because the question called for a great deal of reflection on the part of the participants. We may have been asking too much from the personnel in having them try to identify situation specific preferences. Further, the question involved three alternatives: "on isolated duty", "off isolated duty" and "no difference" -- which could be viewed as a three point scale with "no difference" serving as the subjective midpoint. In that case, the central tendency effect or reluctance to use the end points of a scale would explain in part the high proportion of individuals who indicated no difference.

Response to the Pseudo Food, Braised Trake: As noted earlier in the Factor Analysis section, the two fresh orange items placed apart in the questionnaire had a high intercorrelation and loaded on the same factor. This was a positive sign for the quality of the survey. Braised trake, the pseudo food, was rated *more often than one would have liked*. A total of 153 people indicated they had tried it (29.77% of the total sample) as compared to 19 people in the mainland control group (18.27% of the total of 102 individuals in that group). The response to braised trake varied somewhat across locations as indicated in Table 22.

TABLE 22
Frequency of Responses to the Pseudo Food

Location	Freq of Resp	Total Sample	%
Shemya	36	90	40.0
Newenham	7	41	17.1
Elmendorf	31	108	28.7
Tatalina	11	39	28.2
Yukon	8	57	14.0
Murphy	20	62	32.3
Eielson	30	83	36.1
Lisburne	10	34	29.4

The response to braised trake indicates some inattention to the details of the food names. This may have been true, however, primarily for the more uncommon names. It seems unlikely that anyone would misidentify grilled steak or mashed potatoes. In retrospect, it would have been better to have used two or three pseudo foods to generate a "lie" scale. We could have screened out respondents who indicated they had tried all three items. However, since this was not done, and since the fresh oranges reliability indicator was adequate, we decided to use the data records of those individuals who responded to braised trake, operating on the assumption that the majority of their responses represented "true" variance (more or less) in relation to their actual attitudes towards the foods listed in the questionnaire.

An additional explanation of the response to braised trake could be based on both perception and linguistics. The term "braised" is in common usage around the area of food preparation and once read develops the expectation that what will follow is a realistic food label. The term "trake" could be responded to as "tripe" or "hake", or even "trout".

Consumer Opinions of the Food Service System

Introduction: The primary aim of this study was to develop a better understanding of food habits during isolated duty assignments. An assessment of general consumer opinion of the food service systems within the test sites of the Alaskan Air Command (AAC) was undertaken to place the other data on food preferences, personality, etc., in a valid context. The opinion survey was run in small groups with total samples of 34-63 personnel at remote sites and in larger groups with total samples of 108 and 83 at Elmendorf and Eielson AFB's, respectively.

General Food Service Ratings: Respondents were asked to describe their present food service on a seven-point scale (very bad to very good) for the following variables: hours of operation, food quality, food quantity, food variety, and speed of service. The average scaled scores are shown for each base in Table 23. Any average below 4.0 shows dissatisfaction to some degree with the system, whereas average ratings above 4.0 indicate relative satisfaction with the system. These will serve as our working definitions.

Ratings of hours of operation showed satisfaction at all bases, according to the above definitions. An analysis of variance demonstrated significant difference between bases (8), and post testing using the Newman-Keuls procedure indicated that personnel at Cape Newenham and Murphy Dome were more satisfied with the hours for dining facility operation than were personnel at the majority of other bases including controls (Table 24).

TABLE 23

Describe Your Present Food Service (Mean Rating)*

	Hours	Food Quality	Food Quantity	Food Variety	Speed
Tatalina	4.74	4.59	5.31	4.36	4.77
Newenham	5.61	4.83	5.92	4.98	5.34
Lisburne	4.85	5.18	5.12	4.65	4.94
Shemya	4.67	3.08	3.71	2.81	3.38
Fort Yukon	4.54	4.26	5.32	4.30	4.30
Murphy Dome	5.69	5.00	5.78	4.84	4.70
Eielson	4.30	4.36	4.14	3.98	3.90
Elmendorf	4.72	3.52	4.63	4.10	4.10
Pooled Sample	4.82	4.13	4.79	3.96	4.24

*Scale Employed:

Very Bad	Bad	Slightly Bad	Neither Bad Nor Good	Slightly Good	Good	Very Good
1	2	3	4	5	6	7

TABLE 24*

Results of Newman-Keuls Test on Hours of Operation

Location	Eielson	Yukon	Shemya	Elmendorf	Tatalina	Lisburne	Newenham	Murphy Dome
Mean Satisfaction	4.3	4.5	4.6	4.7	4.7	4.8	5.6	5.7
Differences								

*Note that locations which share common underlining do not differ significantly. See the statistical explanation in the Appendix for further information if necessary.

Ratings of speed of service showed satisfaction at all bases except Shemya (3.38) and Eielson (3.90) which approached the neutral ratings of 4.0. This was supported by an ANOVA between locations which was significant (9). The Newman-Keuls Test indicated that Shemya and Eielson had the lowest satisfaction relative to speed of service while Newenham had the highest (Table 25).

TABLE 25

Results of Newman-Keuls Test of Speed of Service

Location	Shemya	Eielson	Elmendorf	Yukon	Murphy Dome	Tatalina	Lisburne	Newenham
Mean Satisfaction	3.4	3.9	4.1	4.3	4.7	4.8	4.9	5.3
Differences								

Thus, with few exceptions, ratings of hours of operation and speed of service show satisfaction with these two features of the food service system, although the variation in degree of satisfaction between locations is great.

Customer ratings of food attributes (quality, quantity, variety) showed more variability and less overall satisfaction. Customers indicated dissatisfaction with food quality at Shemya (3.08) and Elmendorf (3.52). Higher satisfaction than average was shown at Newenham, Lisburne, and Murphy Dome. The ANOVA for food quality was also significant across locations (10). The Newman-Keuls analysis indicated that Shemya and Elmendorf although not different from each other, were significantly lower in satisfaction for food quality than the remainder of the bases (Table 26).

TABLE 26

Results of Newman-Keuls Test on Food Quality

Location	Shemya	Elmendorf	Yukon	Eielson	Tatalina	Newenham	Murphy Dome	Lisburne
Mean Satisfaction	3.1	3.5	4.3	4.3	4.6	4.8	5.0	5.2
Differences								

Dissatisfaction with food quantity was expressed only at Shemya (3.71). All other isolated bases rated food quantity higher than the control base of Eielson and two were higher than Elmendorf. The ANOVA on the quantity variable also showed significant differences across locations (11). The following table provides the information on the specific differences between the bases (Table 27).

TABLE 27

Results of Newman-Keuls Test on Food Quantity

Location	Shemya	Eielson	Elmendorf	Lisburne	Tatalina	Yukon	Murphy Dome	Newenham
Mean Satisfaction	3.7	4.1	4.6	5.1	5.3	5.3	5.8	5.9
Differences								

Finally, dissatisfaction with food variety was expressed at Shemya (2.81) and it approached neutral at Eielson (3.98). Again, with the exception of Shemya, the two control bases rated lower (Eielson 3.98; Elmendorf 4.10) than the isolated bases (4.30 to 4.98). The ANOVA across locations was again significant (12). Here also, an isolated and a "control" base fell together in generating the lowest level of personnel satisfaction as shown by the following table (Table 28).

TABLE 28

Results of Newman-Keuls Test on Food Variety

Location	Shemya	Elmendorf	Eielson	Tatalina	Yukon	Lisburne	Murphy Dome	Newenham
Mean Satisfaction	2.8	3.3	3.9	4.4	4.5	4.6	4.8	4.9
Differences								

The evaluation of the food service system provided by customers on the survey and the interview does not permit a clear distinction between isolated and non-isolated bases. Shemya clearly emerges as a base which has poor food service according to the customers. However, with the exception of Shemya, the two control bases appear to be rated as low or lower than the isolated bases. Several isolated bases (Newenham, Lisburne) appear to receive relatively high ratings by customers on many food service attributes. **Hence, isolated duty food service is not clearly inferior or superior to nonisolated Air Force food service within Alaska, and food service system quality as perceived by the airmen is not likely to have influenced food habit differences found among isolated troops with the possible exception of those personnel at Shemya.**

Opinion of Food Variety: The food service questionnaire asked respondents what changes they felt should be made in terms of the variety of food available. Answers were given on a four-point scale of "(1) many more choices," "(2) few more choices," "(3) choices now enough," and "(4) fewer choices acceptable" (Table 29). With only one exception, no average ratings from any base in any food class were 3.00 or above, indicating all groups preferred more variety. The ratings of starch variety approached 3.00 for most bases indicating close to acceptable variety. Starch variety was rated in most need of improvement at Eielson (2.58). This rating was significantly lower than other bases (13). The food class which ranked next to starches was salads, with means from 2.28 to 2.79. There was no clear effect of isolation on this class, which is one of the most susceptible to isolation transportation problems. Thus, Shemya (2.45) rated virtually the same as Elmendorf (2.44) for salads variety. Tatalina and Newenham personnel indicated that they would like more variety in salads than Murphy Dome and Eielson (14). Ratings of vegetables were similar to the salad ratings (15) although both control bases are near the lower end of the ratings. The ratings for beverages expressing a desire for more variety were significantly different across locations, but not systematically different between isolated and control groups (16). The people at Shemya wanted more variety than those at any other base in Alaska. **Those at Eielson and Murphy-Dome were more satisfied with the beverage variety than the personnel at the other Alaskan bases.** People at Shemya wanted more variety in desserts than those at all bases except Elmendorf (17). **Shemya and Elmendorf personnel were united in their desire for more meat variety than those at all other Alaskan locations (18).** Elmendorf personnel also felt they needed more variety in short order items than did respondents at two isolated bases Murphy-Dome and Tatalina (19). In no other cases did personnel on the various bases differ on their stated needs for increased short order variety. **Meat items were rated as the class desired in most variety and to the greatest degree.** This finding is in keeping with previous data gathered in Air Force garrison food service systems within CONUS, showing most dissatisfaction with the variety of meats (Waterman, et al., 1974; Branch, Meiselman and Symington, 1974).⁴⁶

⁴⁶ Branch, L. G., Meiselman, H. L. and Symington, L. E. *A consumer evaluation of Air Force food service*, (TR 75-22 FSL). US Army Natick Laboratories, Natick, Mass, Food Sciences Laboratory, 1974.

TABLE 29

Changes in Variety (Mean Rating)

	Meats	Short Order	Beverages	Dessert	Salads	Vegetables	Starches
Tatalina	2.18	2.34	1.97	2.31	2.28	2.26	2.92
Newenham	2.32	2.17	1.88	2.44	2.29	2.41	2.90
Lisburne	2.41	2.12	1.88	2.68	2.41	2.59	2.91
Shemya	1.82	2.07	1.46	1.93	2.45	2.43	2.75
Fort Yukon	2.35	2.07	2.00	2.66	2.66	2.75	3.04
Murphy Dome	2.35	2.34	2.77	2.79	2.70	2.47	2.87
Eielson	2.21	2.29	2.68	2.49	2.79	2.41	2.58
Elmendorf	1.74	1.92	2.25	2.10	2.44	2.17	2.72
Pooled Sample	2.09	2.13	2.14	2.36	2.53	2.41	2.80

Summary on Opinions of Food Variety: Customers rated the variety of starch as close to adequate, while requesting a few more choices of other food classes. No clear pattern of requests for increased variety delineated the isolated and control bases. Both Shemya and Elmendorf personnel tended to indicate a desire for more variety than the other bases for several food classes. An increase in the quantity variety of meat items were most strongly desired by the majority of personnel in Alaska.

Other Variety Indicators: The effect of isolated duty on the need for food variety was specifically asked on the survey (#15). On a seven-point scale ranging from, "(1) prefer much more variety" through "(4) prefer same variety" to "(7) prefer much more variety on non-isolation", the mean response of the total sample (control plus isolated) was 3.04 (Table 30 indicating that personnel, on the average, preferred slightly more variety when isolated. The results for individual bases ranged from 2.74 to 3.42, with only Eielson exceeding 3.09. Thus, there is no clear difference between personnel at control and isolated bases, both groups stating that they would prefer slightly more variety on isolation (20). About 1/3 of the respondents said they would like the same variety on isolation (range 26 - 41%), and under 1/5 requested less variety on isolation (range 6 - 18%).

TABLE 30*

Variety: Isolation vs. Non-Isolation (Mean Ratings)

Lisburne	2.74
Newenham	2.88
Shemya	2.88
Fort Yukon	3.02
Murphy-Dome	3.03
Tatalina	3.05
Elmendorf	3.09
Eielson	3.42
Total	3.05

*Scale employed:

Much More Variety
on Isolation

1

2

3

The Same
Variety

4

5

6

Much More Variety
on Non-isolation

7

When asked in the survey whether they would prefer a menu which consisted of only a few high preference foods (question #16) most people disagreed. On a nine-point scale from "(1) disagree strongly" to "(9) agree strongly"; average responses ranged from 2.7 to 3.4 across bases. These were not significantly different (21). This indicated that Alaskan personnel, regardless of location, **preferred a varied menu even if it meant that not all the menu items were those which they "liked very much"**.

Food Quantity: A series of questions on both the survey and the interview were aimed at determining whether personnel ate more food on isolated duty. Recall that in the evaluation of food service, food quantity was one of the more positive aspects of food service. In fact, it was rated more positively at the isolated bases (with the exception of Shemya) than at the two control bases. Question #17 on the survey asked whether people were eating more or less of each of five food classes on their present assignment. A rating of 4 was neutral, with lower values (1, 2, 3) indicating eating less within a food class and higher values (5, 6, 7) indicating eating more. Results for all bases (see row marked "overall", Table 31) indicates that personnel reported about the same intake of meat, with somewhat less consumption of dessert, starch, vegetables, and snacks. Shemya scored below 4 on all food classes (2.93 to 3.52) indicating people eating less of everything. At Fort Yukon, personnel reported eating slightly more of everything (4.08 to 4.20) except snacks (3.22). **The consensus of these data is that on the average people report eating slightly less food at most Alaskan Air Command Bases.**

The results of analyses of variance across locations were informative. Shemya personnel reported eating less meat than those at all other bases in Alaska (22). There were no significant differences between bases relative to starch intake changes (23), and the differences on the vegetable variable, although significant (24), did not lead to any clear discriminations between locations. Concerning desserts, Shemya personnel reported that they were eating less than those at Murphy-Dome and at Ft. Yukon (25). Snacks showed a significant ANOVA (26), which again did not lead to any clear separation between the bases. The scale which asked respondents to report "overall" intake changes on their current assignment did show between location differences (27). Shemya personnel indicated that they were eating less than on their previous assignment, and their average rating was significantly below that of all bases except Eielson and Tatalina.

The average, in this case, however, hides some interesting detail. If one examines the percentage of personnel reporting that they eat more or less overall, one finds substantial percentages reporting both (Table 32). In general, more people reported eating less on their present assignment than reported eating more, especially at Shemya where 65% indicated they were eating less, while only 13% reported eating more. The only exception was Newenham where equal percentages (44%) reported eating more and less. However, substantial percentages reported eating more, averaging 29% for the total sample, as compared with 46% of the total sample who stated that they were eating less. **Thus, most people are reporting a food intake change on their Alaskan assignment, and the control bases do not appear different from the isolated bases.**

TABLE 31

Are You Eating More or Less On Your Present Assignment*

	Meat	Vegetable	Starch	Dessert	Snacks	Overall
Tatalina	4.05	3.28	3.85	3.23	3.38	3.63
Newenham	4.63	3.93	3.71	3.63	3.12	3.90
Lisburne	4.21	3.91	3.85	3.48	3.09	3.85
Shemya	3.22	3.49	3.52	3.15	2.93	2.97
Fort Yukon	4.11	4.08	4.11	4.20	3.22	4.11
Murphy Dome	4.44	3.77	3.49	4.13	3.69	3.85
Eielson	3.89	3.83	3.49	3.48	3.72	3.60
Elmendorf	4.08	4.10	3.87	3.37	3.85	3.94
Pooled Sample	4.00	3.82	3.71	3.55	3.44	3.69

*Scale Employed

Much More	More	Slightly More	About the Same	Slightly Less	Less	Much Less
7	6	5	4	3	2	1

TABLE 32**Relative Percentages of Personnel
Reporting Overall Changes in Food Intake**

Location	Percent Eating More	Percent Eating Less
Tatalina	23.08	43.58
Newenham	43.90	43.90
Lisburne	29.41	47.05
Shemya	13.33	65.55
Fort Yukon	29.83	35.08
Murphy Dome	30.16	39.68
Eielson	28.91	46.98
Elmendorf	37.04	40.74

This result is substantiated by the interview in which people were asked, "Do you eat more or less here compared to your last regular assignment?". The interview was only administered at isolated bases, so data from control bases are not available. These data show similar percentages of total personnel ($n = 83$) eating less (41%) and eating more (42%). This substantiates the survey finding that many people are in a period of food intake change.

In some cases, the interviewer also asked whether the person had gained or lost weight since arriving at the isolated site. Although complete data are not available from all sites, the limited data are suggestive. For example, at Tatalina where 16 people were interviewed, five said that they ate less, seven said that they ate more, and four said that there was no difference. Of the five who said that they ate less, three noted that it was due to conscious dieting. Those three reported weight losses of from 12 to 20 pounds. Five of the seven individuals who said that they ate more reported weight gains of from zero to 20 pounds.

Those individuals who said in response to question #17 that they had altered their food intake between their last and current assignments were asked to indicate why they had changed their levels of consumption (question #18). Alternatives which they were offered included: dieting, food quality (good or poor), supply problems, boredom, same menu or other reasons. Chi Square analyses were done to examine possible relationships between the nature of an individual's location and the reasons he gave for changing his intake of foods in specific food classes. The results of these analyses are presented in Table 33. The classes of starch, vegetables and snacks did not show a relationship ($p > 0.05$) between locations and reasons for changing intake. However, the classes of meat and dessert did show a significant relationship ($p < 0.01$). Also the "overall" class, which probably meant all foods to the respondents, provided a significant location by reasons Chi Square ($p < 0.01$). So it would be appropriate to say that the relative frequency of reasons for changing intake is location-dependent for the meat, dessert and "overall" categories. For example, across all locations which gave poor food quality for meats as a reason, Shemya accounted for 43.55% of these citations and Elmendorf for 30.65%. These two locations accounted for the majority (74%) of all citations in Alaska for poor meat quality. The comparable percentages in the "overall" category were 23.9% for Elmendorf and 40.3% for Shemya. These two bases, one a control and the other an isolated location, accounted for the largest number of reasons for intake change based on overall poor food quality.

When pooling across locations and looking at the relative percentages of reasons for intake changes for foods "overall" the following table may be helpful (Table 34).

TABLE 33

Chi Square Analyses of Locations by Reasons for Changing Food Intake

Food Class	Chi Square	df
Meat	55.01**	35
Starch	45.40	35
Vegetables	34.13	35
Dessert	86.33**	35
Snacks	40.61	35
Overall	67.86**	35

** $p < .01$

TABLE 34

Relative Frequency of Reasons Given for Intake Changes

	Reasons					
	Supply Problems	Dieting	Poor Food Quality	Good Food Quality	Same Menu All the Time	Boredom
Frequency	14	60	67	57	66	101
Percentage	3.84	16.44	18.36	15.62	18.08	27.67

Obviously, supply problems were infrequently cited whereas **boredom** was of considerable importance.

An informative comparison between isolated and control bases was done using the "overall" food scale. A Chi Square analysis (isolation/non-isolation by reasons for changes in food intake) demonstrated a significant relationship (28). Table 35 provides the frequencies and percentages necessary to evaluate this result. Although there were more isolated personnel in the total sample, those at "control" bases gave a higher frequency of all reasons for intake change except one reason: "same menu all the time". The implication is that **people on isolated duty do believe that a repetitive menu influences the amount of food they eat.**

TABLE 35

Chi Square Analyses of the Degree of Isolation
by Reasons for Food Intake Change

Degree of isolation		Dieting	Poor Food Quality	Good Food Quality	Supply Problems	Boredom	Same Menu All The Time
	Frequency	13	22	22	2	33	42
Isolated	Probability Isolated	21.67	32.84	38.6	14.29	32.67	63.64
Non-Isolated	Frequency	47	45	35	12	68	24
	Probability Non-Isolated	78.33	67.16	61.4	85.71	67.33	36.36

Two other questions were concerned with food quantity. Question #13 asked the respondents if they ever left the dining facility without enough to eat, and question #19 asked them to rate the average serving size within their facility. Question #13 involved a four-point scale from "1) always leave without enough to eat" to "4) never leave without enough to eat". Those who reported most frequently that they left the dining facility at least sometimes without enough food were: Shemya, 76%; Eielson, 76%; Elmendorf, 71%. The range on the other isolated bases was 29 to 46%. ANOVA demonstrated significant differences between locations (29). Although the range was somewhat narrow due in part to the 4-point scale used the differences between locations are still very apparent in the following table and supportive of the conclusions stated above (Table 36).

TABLE 36

Results of Newman-Keuls on "Do you ever leave the dining hall without enough to eat?"

Location	Shemya	Eielson	Elmendorf	Tatalina	Yukon	Lisburne	Murphy Dome	Newenham
Mean								
Response	2.9	2.9	3.0	3.4	3.5	3.5	3.6	3.7
Differences								

The respondents' rating of portion size led to significant variability on two scales: Meat (30) and "overall" (31). The possible scale values ranged from "1) too little" to "7) too much." No mean for any base was higher than 4.45 for meat, which indicated that on the average personnel in Alaska felt that meat portions were adequate or less than adequate, but in no case were they more than enough. The following table describes the differences between locations on ratings for meat portion sizes (Table 37).

Table 37

Results of Newman-Keuls Analysis on Portion Size for Meat*

Location	Shemya	Elmendorf	Eielson	Lisburne	Tatalina	Yukon	Murphy Dome	Newenham
Mean Ratings	2.71	2.76	2.90	3.05	3.57	3.61	3.93	4.46
Shemya	2.71					*	*	*
Elmendorf	2.76					*	*	*
Eielson	2.90						*	*
Lisburne	3.05						*	*
Tatalina	3.47							*
Yukon	3.61							
Murphy Dome	3.93							
Newenham	4.46							

Significant ($p < .05$) differences represented by ""s" in the body of the table

Scale employed: Portion Size

Too Little			About Right			Too Much
1	2	3	4	5	6	7

The ratings on portion size at Shemya and Elmendorf were significantly below those at three isolated bases. The ratings at Eielson and Lisburne were also low and below those at Murphy Dome and Newenham. It is interesting that the two control bases were at the lower end of the meat portion size continuum although they would not have the resupply problems of the isolated bases.

Concerning "overall" portion size for food, Shemya and Elmendorf were again rated lowest and significantly below either Murphy Dome or Cape Newenham. The number of differences were not as frequent as they were for meat, as can be seen in the following table (Table 38).

TABLE 38*

Results of Newman-Keuls Analysis on Overall Portion Size

Location		Shemya	Elmendorf	Eielson	Tatalina	Lisburne	Yukon	Murphy Dome	Newenham
	Mean Ratings	3.22	3.26	3.40	3.70	3.78	3.84	4.05	4.25
Shemya	3.22							*	*
Elmendorf	3.26							*	*
Eielson	3.40								*
Tatalina	3.70								
Lisburne	3.78								
Yukon	3.84								
Murphy Dome	4.05								
Newenham	4.25								

*Scale employed: See Table 37

These results on portion size again demonstrate the lack of discriminable differences between isolated and control bases concerning food. However, with the exception of Shemya, the control bases did not fare well on portion size when compared to most isolated bases. It would have been desirable if personnel at all bases had reported that they were getting enough food, but this did not occur, especially for meat which appears to be a key area of concern. Table 39 presents the average ratings for all portion scales at all bases. The fact that people rated meat portion size as lowest is in line with previous findings collected at mainland Air Force Bases (Branch, Meiselman, and Symington, 1974). Meat is after all a high cost item and portion control is very important. One might suggest, however, that slight increases in the availability of meat for Alaskan bases could be a morale booster. This could be coupled with a reduction in starch products which may be overserved in an effort to control the consumption of the higher cost meat.

Summary of Food Service Questionnaire: The results of this questionnaire indicated clearly that on all food service variables, there was no clear separation between isolated and control bases. Consumers had opinions of the food service at each base which were location specific. Ratings of speed of service showed personnel satisfaction at all bases except Shemya and Elmendorf. These same two bases were also rated lowest for food quality, and variety. Meat items were rated as the class of foods to which increased variety was important to most personnel in Alaska. The desire for more variety in other food classes was present at all bases to varying degrees. When asked if they would like a limited menu of high preference items, the consensus across bases was that a varied menu was

TABLE 39

Average Amount Per Serving*

	Meat	Starch	Vegetable	Dessert	Snacks	Overall
Tatalina	3.47	4.66	3.45	3.78	3.15	3.70
Newenham	4.46	4.83	4.09	4.00	3.35	4.25
Lisburne	3.05	4.16	3.58	4.00	3.27	3.78
Shemya	2.71	4.22	3.50	3.41	3.02	3.23
Fort Yukon	3.61	4.53	4.00	4.05	2.82	3.84
Murphy Dome	3.93	4.38	3.93	4.22	3.61	4.05
Eielson	2.90	4.03	3.58	4.02	3.10	3.40
Elmendorf	2.76	4.39	3.38	3.66	3.39	3.26
Pooled Sample	3.18	4.34	3.61	3.80	3.20	3.55

*Scale Employed: Amount per serving

Too Little			About Right			Too Much
1	2	3	4	5	6	7

desirable. Personnel, in general, reported eating less in Alaska than they had on previous assignments, although as many as 29% reported eating more. These results lead to the conclusion that personnel were in a period of intake change. When asked why intake had changed, individuals at Shemya and Elmendorf cited poor food quality more often than did individuals at other bases in Alaska. In general, poor food quality, repetitive menu, and boredom were the most frequent reasons reported for intake change. There was an implication that people on isolated duty were negatively influenced by repetitive menus. When asked if they had enough to eat, Shemya, Eielson and Elmendorf personnel indicated that at least some of the time they did not have enough. The major area of concern at all bases was small meat portions. It was generally concluded that starches were over-abundant.

Food Service Worker Job Satisfaction

Introduction: The concept of job satisfaction and worker productivity has become increasingly important to those who look at organizational development from a systems viewpoint. The early Hawthorne studies indicated that only management interest in the workers themselves would increase the volume of production. The older conceptions of choosing the man to fit the job and ignoring him thereafter have gone by the board. Current theories of industrial motivation such as those of Herzberg and McDougal emphasize that what was traditionally viewed as adequate reward for work produced, usually financial incentives, have not served well to make the worker satisfied (Gellerman, 1963).⁴⁷

Measures of job satisfaction have been available in one form or another for many years. Lawshe (1948)⁴⁸ cites one of the earliest studies in the area as that of Scott and Hayes in 1921. These researchers tried to associate satisfaction with intellectual functioning as estimated from school records. Lawshe noted that this was prior to the adequate development of intelligence tests.

Vroom (1964)⁴⁹ noted that using a variety of techniques, applied psychologists have tried to relate satisfaction to supervision, type of work, job content, wages, promotion opportunity, and work hours. A "satisfying work rule" appears to be one that involves good pay, chances for promotion, participative supervision, peer interaction, varied duties, and a high degree of control over work methods and work pace.

⁴⁷ Gellerman, S. W. *Motivation and productivity*. New York: American Management Association, 1963.

⁴⁸ Lawshe, C. H. *Principles of personnel testing*. New York: McGraw, 1948.

⁴⁹ Vroom, V. H. *Work and motivation*. New York: Wiley, 1964.

Obviously these ideals are not always conducive to the food service worker situation and especially to that of the military food service worker. Interest in food service worker satisfaction is relatively new and was discussed in relation to civilian workers by Hodgkin (1974).⁵⁰ It has been pointed out that satisfaction varies across types of jobs, and that such factors as occupational prestige and individual control over work decisions were some of the relevant concerns (Tiffin and McCormic, 1965).⁵¹ It was for these reasons that we decided to examine the job satisfaction of food service workers at isolated bases within Alaska. Symington and Meiselman (1975) measured satisfaction of personnel, both military and civilian at Travis Air Force Base on a project to evaluate Air Force Garrison Food Service. They employed the Job Description Index (JDI) developed by Patricia Smith at Cornell University, (Smith, Kendall, and Hulin, 1969).⁵² We elected to employ the same instrument on the isolated duty study, because we had previous experience with it and some normative data from previous Air Force Studies; and also, because it is fairly rapid to administer. This latter consideration is important, based on our belief that the accuracy of the information we collect is related to how little our data collection interferes with current operational requirements of host units.

Description of the JDI: The JDI attempts to measure satisfaction in five key areas of work. These areas are repeatedly mentioned in the literature of industrial/applied psychology as being important in the area of job satisfaction. They include: the type of work, the pay, the opportunities for promotion, the supervision, and the co-workers on the job. Under each area is a list of adjectives or descriptive phrases, and satisfaction is evaluated on the basis of the individual's responses to these. Response alternatives to each work or phrase include: Y (YES), N (NO) or ?. The individual responds in accordance with his preceptions of how descriptive each term is of his job. An example of the scale design taken from Symington and Meiselman (1975) is presented below:

WORK

Fascinating	Y	N	?
Routine	Y	N	?
Boring	Y	N	?
Good	Y	N	?

⁵⁰ Hodgkin, G. L. Development of Career Progression Systems for Employees in the Food Service Industry. *National Restaurant Association Publication*. 1966, 19, 67-80.

⁵¹ Tiffin, J. and McCormick, E. J. *Industrial psychology*, (Fifth Edition), Englewood Cliffs: Prentice Hall, 1965.

⁵² Smith, P. C., Kendall, L. M. and Hulin, C. L. *The measurement of satisfaction in work and retirement*, Chicago: Rand McNally, 1969.

Scoring of the JDI was based on preliminary research in which the positive or negative values of each item were determined. Items like "good" and "fascinating" would be scored as indicating satisfaction if the respondent circled the YES alternative. If he circled NO, this was an indication that he was dissatisfied. In each job area the range of possible scores on the JDI is 0 to 54. These are obtained by first scoring the responses to the works or phrases as: Satisfied, +3; dissatisfied, 0; and ?, +1. The results of the responses are summed for the work, supervision and co-workers scales; and summed, then doubled, on the pay and promotion scales which have fewer items.

Subjects and Procedure: At each* isolated base that we visited all military members of the food service staff that were available filled out a copy of the JDI after receiving a brief explanation of its purpose and format. A total of 37 personnel were sampled at isolated bases and 11 at a main base (see Table 40).

TABLE 40

**Distribution of Food Service Workers
Surveyed in Alaska**

Isolated Bases	Number
Cape Newenham	5
Tatalina	6
Shemya	11
Fort Yukon	10
Murphy Dome	5
Main Bases	
Eielson AFB	11

Comparisons Across Bases: The scores within each job area for each location were averaged. Also an average was computed for all isolated bases pooled. These data are presented in Table 41. Also included for comparison at a descriptive level are means which could be considered as norms for workers at three CONUS bases: Travis, Minot and Homestead Air Force Bases (Symington and Meiselman, 1975).

An examination of this table indicates that there is some variability in worker satisfaction across isolated bases and also between isolated bases and main installations.

*Note: Data from 5 workers at Cape Lisburne were lost in transit.

When scores are averaged across isolated bases the composite means do not appear markedly different from those of Eielson or the Mainland Norms.

An examination across the scales of the JDI indicates a pattern of responses which seems to hold more or less across groups, including the normative data. To the extent that interscale comparison has any meaning the workers tend to be more satisfied with their supervision and co-workers and less satisfied with their pay, promotions, and the work itself. This finding is consistent with the results of Siebold, Symington, Graeber, and Maas (1976) in another Air Force study and also is in line with civilian norms (Smith, et al. 1969). The relative importance of the five job areas to worker satisfaction has been seen to vary somewhat from this pattern as reported by Siebold, Symington, Meiselman, and Rogozenski (1975) in a Navy Study at NAS Alameda. The Air Force results seem to be so consistent as to indicate that should attempts be made to improve worker morale, the area of concern is the work itself because pay and promotions are not completely under local control.

A nonparametric analog to the analysis of variance, the Kruskal-Wallis H , was applied to JDI scores for the isolated bases and Eielson AFB as a control base. Most of the scales did not produce significant differences ($P > .05$), with the exception of the promotion scale (32). Although Air Force promotions follow certain standardized rules, there appears to be variation in the satisfaction involved and possibly in the subjective evaluation of promotion potential on the part of the workers themselves.

It is apparent that there is more variability between remote locations than between remote and non-remote bases. There really is no basis for indicating that remote food service workers are any more or less satisfied with their work than those who work at the larger main bases. This conclusion must be qualified by the fact that the measurement of satisfaction is not a precise science and that the lack of statistically significant differences is not a guarantee that some do not exist; also the sample size was limited.

Worker satisfaction may or may not be related to the more relevant aspects of this study -- specifically, customer satisfaction with the food and the food service system. It could not be ignored, however, and we found some face validity to the fact that mean JDI scores were lower at one base in particular -- Shemya. The corresponding opinions of consumers were discussed in another section.

Since the JDI attempts to measure worker attitudes toward some aspects of his job, one might ask what relationship, if any, do those attitudes have to customer perceptions of the food service system. This is a difficult question to answer statistically because one cannot take individual JDI scores and relate them directly to attitudes expressed by individual customers. In order to obtain a rough estimate of the relationships it was decided to correlate the average JDI scores for each base against selected average scale values on the food service questionnaire.

TABLE 41

**Mean Responses to the JDI for Isolated and Main Bases
(Comparison Norms Included)**

Scale/Base	Newenham	Tatalina	Shemya	Yukon	Murphy Dome	Total Isolated	Eielson	Mainland AF Norm
Work	22.0	27.7	17.0	23.5	27.6	22.59	23.8	23.72
Supervision	32.4	39.2	33.2	35.4	46.0	36.38	37.2	38.89
People	19.6	31.2	22.4	33.4	36.0	27.95	30.9	34.98
Pay	25.6	22.0	12.0	23.0	26.4	18.59	23.1	21.26
Promotion	24.4	21.0	7.0	23.4	44.0	21.05	16.9	25.69

Correlation using means as data has certain attendant technical problems. In order to control for these in part, we used a high level of significance $P < .01$ to determine which correlations were meaningful. A correlation had to exceed $r = 0.874$ in order to meet this criterion. Table 42 presents the computed significant correlations between selected food service questionnaire items on the left margin and JDI scales across the top.

It is not unreasonable to assume that worker attitudes may in some way be expressed in the food they produce. As indicated earlier in this discussion, worker responses to the pay scale of the JDI tend to be lower than to some of the other scales. We note in Table 42 that average JDI pay correlates significantly with the customer evaluation of: (1) quality and variety of food service, (2) variety and serving size of desserts (3) and the amount of meat the customer chooses to eat. It would appear that these areas of food service are rated higher on the average at those bases where workers are more positive about their salary scale. At bases where they are more positive about the work itself, customers rate the variety of meats higher. It is unclear at this time why these relationships occur.

TABLE 42

**Correlations Between Food Service Worker
and Customer Satisfaction**

Customer Satisfaction Scale	JDI Scale	
	Pay	Work
Present Food Service		
Quality	.972**	
Variety	.959**	
Food Variety		
Desserts	.884**	
Meats		.904**
Are You Eating More?		
Meat	.941**	
Serving Size		
Dessert	.944**	

** $P < .01$

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APPENDIX

EXPLANATION OF STATISTICAL TERMS

The non psychologist/statistician may find some of the statistical terms confusing. A brief explanation will follow of those concepts cited in this report. This explanation is not meant to be all inclusive, but rather to simply enhance the general understanding of the report text.

a) **t Test:** Suppose a sample of individuals is chosen from each of two groups, and some measure is taken on each individual. If the measure meets certain mathematical requirements, a t test can be applied. We ask the question: "is the difference between the **averages** of the two samples large enough so that it probably did not occur by chance." The result looks like this:

$$t(24) = 7.96, P < .01$$

We compare this to tabulated values, and if the computed t exceeds the appropriate value, we can say that the two groups are significantly different. The $P < .01$ means that if the experiment is repeated many times, in 1% of the cases a difference as large as the one we found could occur by chance.

b) **Analysis of Variance (ANOVA), F test:** Suppose you have more than two groups. The ANOVA is applied to determine if there are any differences between groups large enough not to have occurred by chance alone. The F looks like this:

$$F(7,450) = 8.91, P < .01$$

If this had been applied to measures taken on individuals from four groups, we would then know that they differed some-how. However, the ANOVA does not tell you between which groups the actual differences exist.

c) **Newman-Keuls Technique:** Having done an analysis of variance and having obtained a significant F value, the experimenter may want to examine differences between groups. The Newman-Keuls technique is a method of comparing the averages of the group samples and determining which groups are significantly different from which. The method of reporting the results of a Newman-Keuls technique involves a table or diagram. The following is an example:

GROUP	C	A	D	B
MEAN	3.2	3.6	3.9	4.7
DIFFERENCES	<hr/>			

Groups which share common underlining do not differ significantly. Groups which do not share common underlining are significantly different. In the above example group B is different from all other groups. Group D is different from Group C but not from Group A. It takes some practice to learn how to read these diagrams; but once accomplished, they are easily interpreted.

d) Chi Square (χ^2): Suppose you have multiple categories of classifications, and the data you are concerned about is how individuals distribute themselves across these categories. You are no longer dealing with averages, but rather with frequency counts. Chi Square is a way of determining whether the frequency distribution occurred by chance or represents a valid difference based on the nature of the categories. The result of computations looks like this:

$$\chi^2(7) = 15, P < .05$$

This particular result would be significant, and if the experiment were repeated many times, a Chi Square as large as the one we found could occur by chance alone 5% of the time.

e) Kruskal-Wallis H: Occasionally when you have multiple groups and data which can be rank ordered across groups, you may want to ask whether any group has a disproportionate share of the higher or lower ranks. The Kruskal-Wallis H answers this question. The result looks like this:

$$H(6) = 18, P < .01$$

This indicates that there is significant variability in the ranks between the groups. It does not tell you precisely between which groups the differences lie.

f) Correlation: Unlike the previous tests which have looked for differences between groups, the correlation looks for a relationship between two variables. It ranges from -1 to 1 and the closer it gets to either of these numbers and away from zero, the stronger is the relationship. If age and height of children correlated, for example, the correlation might range from $r=0.70$ to $r=0.95$ indicating that as age increases, so does height.

TABLE A-1

Statistical Tests Cited in the Text*

(1)	χ^2	= 71.39	P < .01
(2)	t (444)	= 1.75	P > .05
(3)	t (444)	= 2.97	P < .01
(4)	F (7,425)	= 2.34	P < .05
(5)	F (7,425)	= 2.57	P < .05
(6)	F (7,425)	= 4.0	P < .01
(7)	F (7,429)	= 3.79	P < .01
(8)	F (7,503)	= 7.31	P < .01
(9)	F (7,506)	= 10.36	P < .01
(10)	F (7,504)	= 20.5	P < .01
(11)	F (7,504)	= 19.5	P < .01
(12)	F (7,503)	= 19.76	P < .01
(13)	F (7,492)	= 2.88	P < .01
(14)	F (7,497)	= 4.08	P < .01
(15)	F (7,497)	= 4.56	P < .01
(16)	F (7,499)	= 27.9	P < .01
(17)	F (7,500)	= 10.03	P < .01
(18)	F (7,499)	= 10.39	P < .01
(19)	F (7,492)	= 3.32	P < .01
(20)	F (7,500)	= .99	P > .05
(21)	F (7,503)	= .97	P > .05
(22)	F (7,499)	= 5.78	P < .01
(23)	F (7,497)	= 1.29	P > .05
(24)	F (7,495)	= 2.28	P < .05
(25)	F (7,498)	= 3.42	P < .01
(26)	F (7,495)	= 2.73	P < .01
(27)	F (7,494)	= 3.96	P < .01
(28)	χ^2	= 30.7(5)	P < .01
(29)	F (7,506)	= 11.01	P < .01
(30)	F (7,361)	= 10.40	P < .01
(31)	F (7,356)	= 6.00	P < .01
(32)	H	= 36.6	P < .001

*Noted in text with a number in parenthesis

TABLE A-2

Ranked Food Preferences in the Isolated Sample

Food Name	Rank	Mean	SD	N
Grilled Steak	1	8.25	1.16	321
Fresh Oranges	2	7.66	1.59	319
Roast Beef with Gravy	3	7.61	1.39	321
Fresh Oranges	4	7.58	1.64	320
Orange Juice	5	7.52	1.59	320
Roast Turkey and Gravy	6	7.45	1.48	320
Baked Ham	7	7.41	1.47	321
Pizza	8	7.40	1.82	319
Tossed Salad	9	7.36	1.59	320
Fresh Apples	10	7.34	1.72	319
Milk	11	7.32	2.15	320
Ice Cream	12	7.31	1.73	318
Apple Pie	13	7.27	1.69	319
Pork Chops	14	7.25	1.53	321
Eggs to Order	15	7.21	1.77	321
<i>Fried Chicken</i>	16	7.20	1.75	321
Corn on the Cob	17	7.13	1.75	318
Hamburger	18	7.11	1.49	320
French Fried Potatoes	19.5	7.03	1.58	321
Hash Brown Potatoes	19.5	7.03	1.72	319
Tacos	21.5	6.97	2.14	315
Cantaloupe	21.5	6.97	2.08	314
Cheeseburger	23	6.96	1.70	319
Swiss Steak	24	6.92	1.67	320
Doughnuts	25.5	6.87	1.70	317
Spaghetti and Meatsauce	25.5	6.87	1.94	319
Cola	27	6.74	1.87	317
Chocolate Milk	28.5	6.71	2.08	316
Canned Peaches	28.5	6.71	1.73	318
Beef Stew	30	6.70	1.66	318
Green Beans	31	6.69	1.76	319
Bacon	32.5	6.67	1.87	321
Roast Pork	32.5	6.67	1.85	320
Chocolate Cake	35	6.66	1.90	319
Honeydew Melon	35	6.66	2.12	279
Baked Potatoes	35	6.66	1.86	319
Shrimp Creole	37	6.62	2.14	274

TABLE A-2

Ranked Food Preferences in the Isolated Sample (cont'd)

Food Name	Rank	Mean	SD	N
Fruit Cocktail	38	6.61	1.78	320
Waffles	39	6.59	1.98	311
Brownies	40	6.57	1.93	318
Sausage Links	41	6.53	1.89	316
French Toast	42	6.52	1.93	316
Deville Eggs	43.5	6.51	2.25	308
Lasagna	43.5	6.51	2.19	317
Boston Baked Beans	45	6.50	1.83	302
Barbecued Chicken	46	6.49	1.88	320
Creamed Corn	47	6.43	2.21	316
Fried Fish	48.5	6.40	2.02	319
Beer	48.5	6.40	2.58	311
Peas	50	6.39	2.02	318
Chili Con Carne	51	6.38	1.91	308
Meat Loaf	52	6.34	2.06	319
Macaroni and Cheese	53.5	6.32	2.16	320
Swedish Meatballs	53.5	6.32	1.94	299
Pumpkin Pie	55	6.30	2.38	315
Spanish Omelet	56.5	6.26	2.24	252
Cheesecake	56.5	6.26	2.21	298
Rice	58.5	6.23	2.12	319
Enchiladas	58.5	6.23	2.43	299
Sweet and Sour Pork	60	6.22	2.31	293
Italian Dressing	61	6.21	2.04	305
Mashed Potatoes	62.5	6.20	2.03	321
Coffee	62.5	6.20	2.67	317
Pepper Steak	64	6.19	2.00	305
Grilled Franks	65.5	6.17	1.81	313
Salisbury Steak	65.5	6.17	1.66	320
Chicken Cacciatore	67	6.16	1.98	262
Cole Slaw	68	6.14	2.18	318
Parsley Buttered Potatoes	69	6.13	1.87	295
Mixed Vegetables	70	6.12	2.08	320
Yellow Cake	71	6.10	1.73	312
Peach Pie	72	6.07	1.99	310
Candied Sweet Potatoes	73	6.01	2.47	311

TABLE A-2

Ranked Food Preferences in the Isolated Sample (cont'd)

Food Name	Rank	Mean	SD	N
Hot Tea	74	5.95	2.26	312
Creamed Beef on Toast	75	5.94	2.32	307
French Dressing	76	5.90	2.07	316
Tuna-Noodle Casserole	77	5.88	2.16	312
Dill Pickles	78.5	5.86	2.03	318
Grapefruit Juice	78.5	5.86	2.33	318
Beef Pot Pie	80	5.78	2.10	310
Polish Sausage	81	5.77	2.40	314
Peas and Carrots	82	5.76	2.08	317
Pork Chop Suey	83	5.73	2.22	282
Stuffed Green Peppers	84	5.65	2.52	311
Dry Cereal	85	5.62	2.02	318
Spanish Rice	86	5.61	2.19	310
Boiled Cabbage	87	5.59	2.59	311
Sauerkraut	88	5.49	2.54	308
Glazed Carrots	89	5.43	2.18	281
Hot Oatmeal	90	5.32	2.31	310
Tomato Juice	91	5.28	2.49	315
Spinach	92	5.07	2.50	310
Lima Beans	93	4.89	2.38	318
Fried Liver	94	4.88	3.02	314
Three Bean Salad	95	4.86	2.17	246
Buttered Zucchini Squash	96	4.64	2.76	254
Stewed Tomatoes	97	4.51	2.48	310
Braised Trake	98	4.22	2.00	92
Low Calorie Soda	99	4.18	2.61	305
Creamed Onions	100	3.93	2.31	268

TABLE A-3

Ranked Food Preferences in the Control Sample

Food Name	Rank	Mean	SD	N
Grilled Steak	1	8.09	1.41	191
Milk	2	7.69	1.76	189
Fresh Oranges	3	7.61	1.61	190
Roast Turkey and Gravy	4	7.56	1.45	189
Pizza	5	7.53	1.45	190
Roast Beef with Gravy	6	7.47	1.55	189
Fresh Oranges	7	7.46	1.56	190
Corn on the Cob	8	7.31	1.74	188
Pork Chops	9.5	7.25	1.67	190
Orange Juice	9.5	7.25	1.65	190
Fresh Apples	11	7.20	1.72	191
Baked Ham	12	7.18	1.55	191
Fried Chicken	13	7.16	1.71	191
Ice Cream	14	7.12	1.72	189
French Fried Potatoes	15.5	7.10	1.85	191
Apple Pie	15.5	7.10	1.71	191
Eggs to Order	17	7.09	1.95	190
Hamburger	18	7.07	1.44	191
Swiss Steak	19	6.95	1.77	187
Hash Brown Potatoes	20	6.88	1.96	189
Cheeseburger	21.5	6.87	1.68	189
Tossed Salad	21.5	6.87	1.86	189
Baked Potatoes	23	6.86	1.82	190
Beef Stew	24	6.85	1.58	189
Cantaloupe	25	6.82	2.26	187
Tacos	26	6.80	2.32	187
Chocolate Milk	27	6.77	1.90	190
Doughnuts	28	6.74	1.90	190
Cola	29	6.73	2.03	191
Canned Peaches	30	6.67	1.81	186
Green Beans	31	6.65	2.00	190
Brownies	32	6.62	1.84	190
Spaghetti and Meatsauce	33	6.57	2.01	190
Fruit Cocktail	34.5	6.53	1.81	189
Chocolate Cake	34.5	6.53	1.99	190
Bacon	36	6.51	1.89	190
Roast Pork	37	6.49	1.93	190
Honeydew Melon	38	6.47	2.19	175

TABLE A-3

Ranked Food Preferences in the Control Sample (cont'd)

Food Name	Rank	Mean	SD	N
Sausage Links	39	6.45	2.00	191
French Toast	40	6.44	1.95	189
Fried Fish	41	6.43	2.23	191
Beer	42	6.37	2.76	186
Enchiladas	43	6.36	2.56	179
Meat Loaf	44	6.35	2.08	191
Rice	45	6.30	2.22	188
Swedish Meatballs	46	6.28	1.99	165
Lasagna	47	6.26	2.27	183
Barbecued Chicken	48.5	6.25	2.11	188
Creamed Corn	48.5	6.25	2.21	190
Grilled Franks	50	6.23	1.79	189
Parsley Buttered Potatoes	51	6.22	2.17	172
Chili Con Carne	52	6.16	2.22	183
Cheesecake	53	6.14	2.42	180
Waffles	54.5	6.12	2.06	188
Peas	54.5	6.12	2.37	190
Shrimp Creole	56	6.03	2.60	151
Salisbury Steak	57	6.01	1.67	190
Pumpkin Pie	58	5.99	2.45	188
Macaroni and Cheese	59	5.98	2.30	189
Beef Pot Pie	60.5	5.96	2.18	180
Pepper Steak	60.5	5.96	2.19	173
Hot Tea	62	5.95	2.53	184
Mashed Potatoes	63	5.91	2.06	188
Devilled Eggs	64	5.87	2.55	174
Boston Baked Beans	65	5.80	2.06	174
Mixed Vegetables	66	5.78	2.29	190
Italian Dressing	67	5.73	2.29	184
Yellow Cake	68	5.72	2.00	187
Cole Slaw	69	5.70	2.22	188
Dill Pickles	70.5	5.68	2.18	189
Chicken Cacciatore	70.5	5.68	2.33	140
Candied Sweet Potatoes	72	5.66	2.62	182
Dry Cereal	73	5.64	2.22	189
Sweet and Sour Pork	74	5.56	2.49	174
Tuna-Noodle Casserole	75	5.53	2.52	189

TABLE A-3

Ranked Food Preferences in the Control Sample (cont'd)

Food Name	Rank	Mean	SD	N
Polish Sausage	76	5.50	2.28	182
Hot Oatmeal	77	5.49	2.29	186
Peach Pie	79	5.47	2.29	183
Pork Chop Suey	79	5.47	2.45	169
Coffee	79	5.47	2.70	187
Peas and Carrots	81	5.46	2.29	190
French Dressing	82	5.43	2.19	188
Grapefruit Juice	83	5.42	2.46	189
Creamed Beef on Toast	84	5.37	2.61	177
Spanish Rice	85	5.28	2.50	184
Stuffed Green Peppers	86	5.26	2.71	183
Sauerkraut	87	5.07	2.67	178
Boiled Cabbage	88	5.01	2.77	182
Spanish Omelet	89	5.00	2.68	164
Glazed Carrots	90	4.98	2.51	171
Tomato Juice	91	4.85	2.70	184
Spinach	92	4.65	2.76	185
Fried Liver	93	4.64	3.01	184
Buttered Zucchini Squash	94	4.47	2.95	152
Lima Beans	95	4.22	2.36	187
Stewed Tomatoes	96	3.98	2.56	181
Braised Trake	97	3.97	1.91	61
Three Bean Salad	98	3.92	2.31	144
Low Calorie Soda	99	3.73	2.45	179
Creamed Onions	100	3.44	2.46	149

NATICK DEVELOPMENT CENTER
1975

FOOD SERVICE QUESTIONNAIRE

We would like you to tell us your opinion of the food service system on your present duty site. Your answers will be used to plan and suggest changes in military food service. THIS IS NOT A TEST. We need your honest opinions.

Most questions will ask you to check the ONE answer which is closest to your opinion. Some questions will have several parts and ask for an answer to each part.

We will give you an example of one type of question where we ask for your opinion without all of the possible choices described by words.

Question:

What is your opinion of the average amount of salad per serving?
Check "Not Appropriate" if you have self-service or if seconds are allowed.

Answer:

Too Little			About Right			Too Much	Not Appro- priate
1	2	3	4	5	6	7	0
_____	_____	_____	_____	_____	_____✓_____	_____	_____

Explanation:

If you feel that the average amount of salad per serving is somewhat too much, but not quite way too much, you would check under the 6, as has been done in the sample above.

If you feel that the amount is slightly less than about right, you would check under the 3.

If you serve yourself or are allowed seconds on salads, you would check under "Not Appropriate."

This is only one example; please read each question carefully.

	Survey ID # _____	Card #1																					
1. Present duty station: _____		2-5																					
2. How many isolated tours have you been assigned on (not including this one): _____		6-10																					
3. Rank: _____		11-12																					
4. Age (nearest year): _____		13-14																					
5. Height: _____ ft. _____ in. Weight: _____ lbs.		15-16																					
6. Length of military service: _____ years _____ months		17-21																					
7. When you are on a tour in which married persons bring their spouses (accompanied tour), do you receive separate rations allowance? Yes _____ No _____ (1) (0)		22-25																					
8. Where do you normally eat most of your meals on a tour in which married persons bring their spouses (accompanied tour)? _____ a) Private residence, home, friend's home _____ b) Military dining facility _____ c) Snack bars and restaurants (on or off post) _____ d) Other (please specify) _____		26																					
9. What are your work hours here? (Use the 24 hour clock) From _____ hours to _____ hours.		27																					
10. Using the 24 hour clock, mark the times at which you eat meals and snacks during a typical day when on accompanied tours regardless of where you eat (dining hall, club, snack bar, off post, etc.). Include all snack times (a doughnut, a candy bar, a beer, etc.). If you do not eat a meal or snack regularly leave the space blank. For example if you eat lunch at 1300 hours, write 1300 in the space next to lunch.		28-35																					
	<table border="1"> <thead> <tr> <th></th> <th>Weekday</th> <th>Weekend</th> </tr> </thead> <tbody> <tr> <td>Breakfast</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Snacks between breakfast and lunch</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Lunch</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Snacks between lunch and supper</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Supper</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>After supper snacks</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>		Weekday	Weekend	Breakfast	_____	_____	Snacks between breakfast and lunch	_____	_____	Lunch	_____	_____	Snacks between lunch and supper	_____	_____	Supper	_____	_____	After supper snacks	_____	_____	36-43 44-67 68-75 6-29* 30-37 38-61
	Weekday	Weekend																					
Breakfast	_____	_____																					
Snacks between breakfast and lunch	_____	_____																					
Lunch	_____	_____																					
Snacks between lunch and supper	_____	_____																					
Supper	_____	_____																					
After supper snacks	_____	_____																					
		*Card #2 Survey ID																					

11. Using the 24 hour clock, mark the times at which you eat meals and snacks during a typical day on this assignment regardless of where you eat (dining hall, club, snack bar, off post, etc.). Include all snack times (a doughnut, a candy bar, a beer, etc.). If you do not eat a meal or snack regularly leave the space blank.

	Weekday	Weekend	
Breakfast	<input type="text"/>	<input type="text"/>	6-13
Snacks between breakfast and lunch	<input type="text"/>	<input type="text"/>	14-37
Lunch	<input type="text"/>	<input type="text"/>	38-45
Snacks between lunch and supper	<input type="text"/>	<input type="text"/>	46-69
Supper	<input type="text"/>	<input type="text"/>	70-77
After supper snacks	<input type="text"/>	<input type="text"/>	6-29**

12. For each category below, please describe your present food service. Place one check mark in each row.

	Very Bad 1	Bad 2	Slightly Bad 3	Neither Bad nor Good 4	Slightly Good 5	Good 6	Very Good 7	
a) Hours of Operation	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	30-34
b) Food Quality	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
c) Food Quantity	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
d) Food Variety	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
e) Speed of Service	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

13. Other than times of dieting, do you ever leave your present dining hall without enough to eat? (Please check one.)

Never 4	Sometimes 3	Often 2	Always 1
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Card #3
Survey ID

30-34

35

**Card #4
Survey ID

14. In your opinion, what changes need to be made at this base in terms of the variety of food available.

	Many More Choices 1	A Few More Choices 2	Choices Now Enough 3	Fewer Choices Acceptable 4
a) For short order foods:	_____	_____	_____	_____
b) For meats:	_____	_____	_____	_____
c) For starches:	_____	_____	_____	_____
d) For vegetables:	_____	_____	_____	_____
e) For salads:	_____	_____	_____	_____
f) For beverages:	_____	_____	_____	_____
g) For desserts:	_____	_____	_____	_____

36-42

15. In comparing isolated and non-isolated bases, would you prefer more variety, less variety, or the same variety of food.

Much more variety on isolation				The same variety				Much more variety on non isolation
1	2	3	4	5	6	7		
_____	_____	_____	_____	_____	_____	_____	_____	_____

43

16. Tell us how much you agree or disagree with the following statement:
"On my present duty, I would be very happy with a menu which had only a few foods on it - all of which I like very much."

Agree Strongly	Agree Somewhat	Agree Mildly	Neither Agree or Disagree	Disagree Mildly	Disagree Somewhat	Disagree Strongly
7	6	5	4	3	2	1
_____	_____	_____	_____	_____	_____	_____

44

17. Are you eating more or less food on your present assignment compared to your last assignment. Indicate your answer for the following classes of foods, and for foods in general:

	Much more 7	More 6	Slightly more 5	About the same 4	Slightly less 3	Less 2	Much less 1
Meat	_____	_____	_____	_____	_____	_____	_____
Starch	_____	_____	_____	_____	_____	_____	_____
Vegetables	_____	_____	_____	_____	_____	_____	_____
Dessert	_____	_____	_____	_____	_____	_____	_____
Snacks	_____	_____	_____	_____	_____	_____	_____
Overall	_____	_____	_____	_____	_____	_____	_____

45-50

18. If you answered more or less for any food classes in 17, check why, for each specific type of food.

	Dieting a	Poor Food Quality b	Good Food Quality c	Supply Problems d	Boredom e	Same Menu All The Time f	Other (Specify) g
Meat	_____	_____	_____	_____	_____	_____	_____
Starch	_____	_____	_____	_____	_____	_____	_____
Vegetables	_____	_____	_____	_____	_____	_____	_____
Dessert	_____	_____	_____	_____	_____	_____	_____
Snacks	_____	_____	_____	_____	_____	_____	_____
Overall	_____	_____	_____	_____	_____	_____	_____

51-56

19. For meals at this base, what is your opinion about the average amount per serving of the following foods. Check "Not Appropriate" if you have self-service and/or second helpings.

	Too Little 1	2	3	About Right 4	5	6	Too Much 7	Not Appropriate 0
Meat	_____	_____	_____	_____	_____	_____	_____	_____
Starch	_____	_____	_____	_____	_____	_____	_____	_____
Vegetables	_____	_____	_____	_____	_____	_____	_____	_____
Dessert	_____	_____	_____	_____	_____	_____	_____	_____
Snacks	_____	_____	_____	_____	_____	_____	_____	_____
Overall	_____	_____	_____	_____	_____	_____	_____	_____

57-62

FOOD PREFERENCES

Your answers to the following questions will help Military Menu Planners put the foods you want on the menus at OCONUS duty sites. THIS IS NOT A TEST. We are interested in your opinion so please do not check your answers with your friends.

On the following pages, please indicate HOW MUCH YOU LIKE OR DISLIKE each food listed. If you have never tried the food or have never heard of it, check the column "NEVER TRIED" next to that item and leave the rest of the line blank.

If you are familiar with a food on the list, you should circle a number in the column "LIKE OR DISLIKE." In order to indicate how much you like or dislike a food, please examine the following scale:

1	2	3	4	5	6	7	8	9
dislike ex- tremely	dislike very much	dislike moder- ately	dislike slight- ly	neither like nor dislike	like slight- ly	like moder- ately	like very much	like ex- tremely

Notice that the rating of 5 is neutral, meaning that you neither like nor dislike the food. Ratings below 5 indicate dislike; ratings above 5 indicate like. Circle whichever number best describes your own feelings toward each food item. Remember to mark every food except the ones you have never tried.

EXAMPLE:

If you like Danish Pastry very much, you would circle:

Danish Pastry 1 2 3 4 5 6 7 (8) 9

If you dislike it slightly, you would circle:

Danish Pastry 1 2 3 (4) 5 6 7 8 9

After rating HOW MUCH YOU LIKE OR DISLIKE THE FOOD, continue across the same line to the next three columns and indicate whether you like this food MORE WHEN ON ISOLATED DUTY, MORE WHEN OFF ISOLATED DUTY, OR whether there is NO DIFFERENCE in how much you like the food during either type of duty.

This is not a survey of how much you like these foods as they are served in the military. Instead, we are interested in how much you like these foods in general. Think of each food in a general way, rather than in terms of the way it was prepared at any particular time or place you have eaten the food.

Survey ID # _____

1	2	3	4	5	6	7	8	9
dislike	dislike	dislike	dislike	neither	like	like	like	like
extremely	very	moder-	slightly	like nor	slightly	moder-	very	extremely
	much	ately		dislike		ately	much	

FOOD ITEM	NEVER TRIED (0)	How much do you like or dislike the food (Circle number)	I like this food more when: (check one)			ADP Card #1 Survey ID
			ON ISO- LATED DUTY	OFF ISO- LATED DUTY	NO DIF- FER- ENCE	
01 Salisbury Steak		1 2 3 4 5 6 7 8 9				6-7
02 Tomato Juice		1 2 3 4 5 6 7 8 9				8-9
03 Mashed Potatoes		1 2 3 4 5 6 7 8 9				10-11
04 Lima Beans		1 2 3 4 5 6 7 8 9				12-13
05 Milk		1 2 3 4 5 6 7 8 9				14-15
06 Eggs to Order		1 2 3 4 5 6 7 8 9				16-17
07 Barbecued Chicken		1 2 3 4 5 6 7 8 9				18-19
08 Pumpkin Pie		1 2 3 4 5 6 7 8 9				20-21
09 Bacon		1 2 3 4 5 6 7 8 9				22-23
10 Fruit Cocktail		1 2 3 4 5 6 7 8 9				24-25
11 French Dressing		1 2 3 4 5 6 7 8 9				26-27
12 Corn on the Cob		1 2 3 4 5 6 7 8 9				28-29
13 Canned Peaches		1 2 3 4 5 6 7 8 9				30-31
14 Cheeseburger		1 2 3 4 5 6 7 8 9				32-33
15 Waffles		1 2 3 4 5 6 7 8 9				34-35
16 Ice Cream		1 2 3 4 5 6 7 8 9				36-37
17 Beef Pot Pie		1 2 3 4 5 6 7 8 9				38-39
18 Stewed Tomatoes		1 2 3 4 5 6 7 8 9				40-41
19 Orange Juice		1 2 3 4 5 6 7 8 9				42-43
20 Devilled Eggs		1 2 3 4 5 6 7 8 9				44-45

	1	2	3	4	5	6	7	8	9							
	dislike extremely	dislike very much	dislike moder- ately	dislike slightly	neither like nor dislike	like slightly	like moder- ately	like very much	like extremely							
FOOD ITEM	NEVER TRIED (0)			How much do you like or dislike the food? (Circle number)						I like this food more when: (check one)			ADP			
								ON ISO- LATED DUTY	OFF ISO- LATED DUTY	NO DIF- FER- ENCE						
21 Pepper Steak				1	2	3	4	5	6	7	8	9				46-47
22 Macaroni & Cheese				1	2	3	4	5	6	7	8	9				48-49
23 Fresh Apples				1	2	3	4	5	6	7	8	9				50-51
24 Spaghetti & Meatsauce				1	2	3	4	5	6	7	8	9				52-53
25 Tossed Salad				1	2	3	4	5	6	7	8	9				54-55
26 Creamed Onions				1	2	3	4	5	6	7	8	9				56-57
27 Spanish Rice				1	2	3	4	5	6	7	8	9				58-59
28 Fried Chicken				1	2	3	4	5	6	7	8	9				60-61
29 Dry Cereal				1	2	3	4	5	6	7	8	9				62-63
30 Peach Pie				1	2	3	4	5	6	7	8	9				64-65
31 Chili Con Carne				1	2	3	4	5	6	7	8	9				66-67
32 Peas & Carrots				1	2	3	4	5	6	7	8	9				68-69
33 Dill Pickles				1	2	3	4	5	6	7	8	9				70-71
34 Baked Potatoes				1	2	3	4	5	6	7	8	9				72-73
35 Brownies				1	2	3	4	5	6	7	8	9				74-75
36 Meat Loaf				1	2	3	4	5	6	7	8	9				76-77
37 French Toast				1	2	3	4	5	6	7	8	9				78-79
38 Roast Pork				1	2	3	4	5	6	7	8	9				Card #2 6-7
39 Enchiladas				1	2	3	4	5	6	7	8	9				8-9
40 Cole Slaw				1	2	3	4	5	6	7	8	9				10-11

1 2 3 4 5 6 7 8 9
 dislike dislike dislike dislike neither like like like like
 extremely very moder- slightly like nor slightly moder- very extremely
 much ately much

FOOD ITEM	NEVER TRIED (0)	How much do you like or dislike the food? (Circle number)	I like this food more when: (check one)			ADP
			ON ISO- LATED DUTY	OFF ISO- LATED DUTY	NO DIF- FER- ENCE	
41 Boston Baked Beans		1 2 3 4 5 6 7 8 9				12-13
42 Braised Trake		1 2 3 4 5 6 7 8 9				14-15
43 Coffee		1 2 3 4 5 6 7 8 9				16-17
44 Spinach		1 2 3 4 5 6 7 8 9				18-19
45 Fried Fish		1 2 3 4 5 6 7 8 9				20-21
46 Apple Pie		1 2 3 4 5 6 7 8 9				22-23
47 Baked Ham		1 2 3 4 5 6 7 8 9				24-25
48 Fresh Oranges		1 2 3 4 5 6 7 8 9				26-27
49 Lasagna		1 2 3 4 5 6 7 8 9				28-29
50 Hot Oatmeal		1 2 3 4 5 6 7 8 9				30-31
51 Creamed Corn		1 2 3 4 5 6 7 8 9				32-33
52 Beer		1 2 3 4 5 6 7 8 9				34-35
53 Cantaloupe		1 2 3 4 5 6 7 8 9				36-37
54 Pork Chop Suey		1 2 3 4 5 6 7 8 9				38-39
55 Creamed Beef on Toast		1 2 3 4 5 6 7 8 9				40-41
56 Fried Liver		1 2 3 4 5 6 7 8 9				42-43
57 French Fried Potatoes		1 2 3 4 5 6 7 8 9				44-45
58 Low Calorie Soda		1 2 3 4 5 6 7 8 9				46-47
59 Polish Sausage		1 2 3 4 5 6 7 8 9				48-49
60 Mixed Vegetables		1 2 3 4 5 6 7 8 9				50-51

	1	2	3	4	5	6	7	8	9	
	dislike extremely	dislike very much	dislike moder- ately	dislike slightly	neither like nor dislike	like slightly	like moder- ately	like very much	like extremely	
FOOD ITEM										ADP
					How much do you like or dislike the food? (Circle number)			I like this food more when: (check one)		
								ON ISO- LATED DUTY	OFF ISO- LATED DUTY	NO DIF- FER- ENCE
61 Swiss Steak					1 2 3 4 5 6 7 8 9					52-53
62 Yellow Cake					1 2 3 4 5 6 7 8 9					54-55
63 Sausage Links					1 2 3 4 5 6 7 8 9					56-57
64 Cola					1 2 3 4 5 6 7 8 9					58-59
65 Three Bean Salad					1 2 3 4 5 6 7 8 9					60-61
66 Roast Beef with Gravy					1 2 3 4 5 6 7 8 9					62-63
67 Doughnuts					1 2 3 4 5 6 7 8 9					64-65
68 Shrimp Creole					1 2 3 4 5 6 7 8 9					66-67
69 Stuffed Green Peppers					1 2 3 4 5 6 7 8 9					68-69
70 Hash Brown Potatoes					1 2 3 4 5 6 7 8 9					70-71
71 Grilled Steak					1 2 3 4 5 6 7 8 9					72-73
72 Fresh Oranges					1 2 3 4 5 6 7 8 9					74-75
73 Pizza					1 2 3 4 5 6 7 8 9					76-77
74 Beef Stew					1 2 3 4 5 6 7 8 9					78-79
75 Candied Sweet Potatoes					1 2 3 4 5 6 7 8 9					Card #3 6-7
76 Grapefruit Juice					1 2 3 4 5 6 7 8 9					8-9
77 Hamburger					1 2 3 4 5 6 7 8 9					10-11
78 Spanish Omelet					1 2 3 4 5 6 7 8 9					12-13
79 Glazed Carrots					1 2 3 4 5 6 7 8 9					14-15
80 Hot Tea					1 2 3 4 5 6 7 8 9					16-17

	1	2	3	4	5	6	7	8	9	
	dislike extremely	dislike very much	dislike moder- ately	dislike slightly	neither like nor dislike	like slightly	like moder- ately	like very much	like extremely	
FOOD ITEM										ADP
					How much do you like or dislike the food? (Circle number)			I like this food more when: (check one)		
								ON ISO- LATED DUTY	OFF ISO- LATED DUTY	NO DIF- FER- ENCE
81 Swedish Meatballs					1 2 3 4 5 6 7 8 9					18-19
82 Chocolate Milk					1 2 3 4 5 6 7 8 9					20-21
83 Italian Dressing					1 2 3 4 5 6 7 8 9					22-23
84 Tacos					1 2 3 4 5 6 7 8 9					24-25
85 Pork Chops					1 2 3 4 5 6 7 8 9					26-27
86 Chocolate Cake					1 2 3 4 5 6 7 8 9					28-29
87 Chicken Cacciatore					1 2 3 4 5 6 7 8 9					30-31
88 Sauerkraut					1 2 3 4 5 6 7 8 9					32-33
89 Roast Turkey & Gravy					1 2 3 4 5 6 7 8 9					34-35
90 Rice					1 2 3 4 5 6 7 8 9					36-37
91 Cheesecake					1 2 3 4 5 6 7 8 9					38-39
92 Sweet & Sour Pork					1 2 3 4 5 6 7 8 9					40-41
93 Boiled Cabbage					1 2 3 4 5 6 7 8 9					42-43
94 Honeydew Melon					1 2 3 4 5 6 7 8 9					44-45
95 Tuna-Noodle Casserole					1 2 3 4 5 6 7 8 9					46-47
96 Green Beans					1 2 3 4 5 6 7 8 9					48-49
97 Grilled Franks					1 2 3 4 5 6 7 8 9					50-51
98 Parsley Buttered Potatoes					1 2 3 4 5 6 7 8 9					52-53
99 Peas					1 2 3 4 5 6 7 8 9					54-55
100 Buttered Zucchini Squash					1 2 3 4 5 6 7 8 9					56-57